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# International Library of Technology

289

A SERIES OF TEXTBOOKS FOR PERSONS ENGAGED IN ENGINEERING PROFESSIONS, TRADES, AND VOCATIONAL OCCUPATIONS  
OR FOR THOSE WHO DESIRE INFORMATION CONCERNING THEM. FULLY ILLUSTRATED

PRODUCTION ORGANIZATION  
PERSONNEL RELATIONS  
TRANSPORTATION  
PACKING AND MARKING  
SPECIAL FREIGHT SERVICES  
FREIGHT TARIFFS, ROUTING, AND  
TRACING  
FREIGHT CLAIMS  
EXPRESS AND PARCEL POST

SCRANTON  
INTERNATIONAL TEXTBOOK COMPANY  
1923



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## PREFACE

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The volumes of the International Library of Technology are made up of Instruction Papers, or Sections, comprising the various courses of instruction for students of the International Correspondence Schools. The original manuscripts are prepared by persons thoroughly qualified both technically and by experience to write with authority, and in many cases they are regularly employed elsewhere in practical work as experts. The manuscripts are then carefully edited to make them suitable for correspondence instruction. The Instruction Papers are written clearly and in the simplest language possible, so as to make them readily understood by all students. Necessary technical expressions are clearly explained when introduced.

The great majority of our students wish to prepare themselves for advancement in their vocations or to qualify for more congenial occupations. Usually they are employed and able to devote only a few hours a day to study. Therefore every effort must be made to give them practical and accurate information in clear and concise form and to make this information include all of the essentials but none of the non-essentials. To make the text clear, illustrations are used freely. These illustrations are especially made by our own Illustrating Department in order to adapt them fully to the requirements of the text.

In the table of contents that immediately follows are given the titles of the Sections included in this volume, and under each title are listed the main topics discussed. At the end of the volume will be found a complete index, so that any subject treated can be quickly found.

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# PRODUCTION ORGANIZATION

(PART 1)

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## INTRODUCTION

**1. The Object of Doing Business.**—Nearly all business is done for the purpose of profit, either present or future. At times, men do business because of the honor and prestige or because it is a duty; but even these things are individual profits for which the particular individual is willing to forego a financial profit. Whether profit should be the principal motive or not, is an interesting question, and perhaps the time will come when other and entirely different motives will actuate manufacturers; but up to the present there appears to be no other incentive that is so effective in making people work as is private gain.

**2. Profit.**—Manufacturing profit is made by selling goods for a greater price than the cost of materials, cost of manufacture, and cost of distribution. So many things enter into all these costs that the only way to tell where the greatest profits are made or where the greatest losses are incurred is by a carefully kept cost system. It may be that in a business returning a comfortable profit the manufacturing processes are more expensive than those of some other concern making a similar product, which may be losing money through a poor sales organization.

Again, it is entirely possible for two businesses to be conducted by the same concern, and even under the same roof, where the profit arises from entirely different parts of the



organization. For example, one department may be building machinery that is sold through an agent who contracts for the whole product. Whatever money it makes then must be made in its production, or manufacturing, department. On the other hand, the next department may have the protection of patents, or in some way have a monopoly for the time being, and it may be possible for it to use the most extravagant production methods and yet make a better profit than is possible to the first-mentioned department.

No matter what department may be the most efficient, any improvement in the production department adds to the profit.

**3. Factors in Production.**—The factors upon which production depends are: (a) The plant, including equipment; (b) the personnel; (c) materials; (d) processes of manufacture; (e) distribution of product.

Under the heading of *the plant* are to be considered the reasons for locating it in some given part of the world; then its location within that district; the actual site chosen; the type of buildings best adapted to the work to be done; the machinery necessary, including the power plant, handling devices, whether traveling cranes or conveyers or simple chutes; and all the things necessary up to the time that the employes report for work.

Under *personnel* are included all the problems of providing a flow of labor toward the plant without undue disturbance of the labor market for other employers, the training of employes and the handling of them so that the outward flow is only sufficient to prevent stagnation in the force. In connection with personnel, also, must be considered the methods of payment for labor and their general relations to the community, as well as the subjects of housing, transportation, feeding, health, exercise, recreation, etc.

The subject of *materials* relates to the purchase or control of raw materials, fuel supplies, etc., as well as the problem of getting them to the plant and ready for manufacturing processes.

Under *processes of manufacture* are included the varied methods of doing the required work on the materials and the assembly of the finished product, if it is such a product. In this connection must be considered the necessary special tools, jigs, and fixtures for expediting the work, that may not have been included under plant.

The subject, *distribution of product*, deals with the distributing or shipping of the product to customers or agents. This work is on the border line between production and sales and may be handled by either the work manager or the sales manager.

Since production requires attention to all these things, some form of organization is necessary to carry on the business; this organization may be a one-man affair, or line and staff, or it may take in everybody in the plant under some form of employe representation.

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## THE PLANT

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### LOCATION

**4. Lessons From Old Plants.**—Many prosperous plants are seemingly located without reference to any business principles. It will usually be found that such plants have begun in a very small way. Often two men, sometimes only one, have thrown up their jobs and begun together in a little shop handy to their homes. The business has developed slowly, but they have put into it every bit of profit above the barest living expenses for themselves. They have had to have larger and larger quarters, but have always been cramped for money. Consequently, they have built on additions of the cheapest type they could, which resulted in the rambling shop that is so hard to organize effectively. When prosperity reached them and they could build wholly new shops, they have found that the old buildings were worthless for any except their own purposes, and they likely have developed a fondness for the old place that brings sentiment into the ques-



tion as a large factor. Study of these plants shows things that should be avoided in a new plant, but is not especially helpful so far as planning new buildings for another firm is concerned; for the location was determined by the necessities of the founders, who may have departed far from their original dreams, and during the time they have been building up their business world conditions may have undergone great change.

**5. Planning a New Plant.**—The man who is fortunate enough to have the opportunity to plan a new shop without the limitations that surrounded the founders of the business is fortunate. If he has the problem of planning a shop to house an entirely new industry which has no traditions, he has an interesting engineering problem, but one which from its very untriedness is full of risks to his reputation and to the stockholders' pocketbooks.

**6. Position on the Line From Material to Customer.**—The first consideration should be to put the plant somewhere in what may be called the straight line connecting the source of materials and the customer. The expression, *straight line*, as here used, does not necessarily refer to a physical straight line, but it means the most direct and feasible route, taking into account the fact that water freights are normally lower than rail, and that established routes of trade are more certain than those which may be more direct in point of miles.

The time element is often of more consequence than actual miles, though in the case of most manufactured goods the matter of perishability is not a factor. In the canning industry, however, it is, and the vegetables, fish, meat, or whatever is to be canned, are put in the tins at a point as near as possible to where they are raised or caught. The tins themselves need not necessarily be made at that point; in fact, they hardly can be, for one can factory has the capacity to supply many widely distributed canneries. The cans should therefore be made on the line between the source of sheet tin and the best distributing point for the various canneries.

If the raw material is heavy or bulky, there is need that the plant be near the source of supply, especially if distribution is wide and the finished product is more compact or lighter than the material. Such is the case, for example, with a certain type of aeronautical engine in which the block of cylinders is machined from a casting that weighs ten times as much as the finished product. A similar condition exists with an ore like bauxite, from which aluminum is made, which must be reduced to metal where electric power is cheap. The ore as mined carries large quantities of water, which must be calcined out; therefore, since it costs just as much for freight on a ton of water as on a ton of bauxite, it is natural that this first step of the manufacturing process should be carried on at the mines. The same is true of many other products; thus copper smelters are at the mines. However, with large capital and water transportation, and the very best means for handling, it is possible to transport iron ore profitably to the steel mills nearer the user.

Often, because of certain conditions, it may not be advisable to locate the plant on the direct line between the materials and the customer, but the matter should always be taken into consideration when making a first location.

**7. Location as Regards Labor Supply.**—The question of a supply of labor should be taken into account in deciding on the location. A plant that is to employ only unskilled or semiskilled labor can afford to pass by this problem, provided the business is large enough to justify building a town of its own. The few skilled men and the executives that are always necessary will go to such a town only reluctantly and under the persuasion of high salaries; but the number of these as compared with the great number of laborers may be so small as to be of comparatively little importance. If, on the other hand, the work is such that many skilled men must be employed, it is better to go far enough from the straight line between material and customer to get a ready flow of the desired type of workers. If women are to be employed, it is necessary that the plant be fairly near to large

centers of population, though there is an exception in the case of mills that employ entire families in which every one over the State-law age works in the mill. Such families will go anywhere that money is offered. There is, however, a gradually increasing tendency for even the lower grades of labor to inquire into the living conditions, and particularly the schools, of the new community. Therefore, if a town or village is planned, it is necessary to make arrangements for schools from the very beginning.

**8. Assembly of Varied Materials.**—Many manufactured products are made of more than one material. The automobile is an example. Hardly any automobile factory makes its own cranks, or cam-shafts. Each shop may grind them, but the forgings are the raw material in such case. These forgings may not be made on the straight line between their raw material and the automobile factories; in fact, a great many of them are not, and largely for reasons that seem almost sentimental. Also, automobiles must have tires, and the tires are made in still other factories, which come nearer to being on the line between their raw material and their market than do the crank-shafts. Automobiles also must have aluminum castings, which are made from an aluminum alloy. The original raw material of aluminum is a hard clay known as bauxite, which comes from France, Arkansas, or South America. The reduction of the ore necessitates the intense heat of the electric arc, which is most cheaply obtained by water-power. Therefore, unless a manufacturer owns his own water-power he is attracted to the immediate vicinity of Niagara Falls, and there he is handicapped by heavy freight rates from his nearest supply of raw materials.

For the foregoing and many similar reasons the automobile manufacturer cannot get very near to the straight line between his raw material and his customer. This, however, is of comparatively little importance, for his greatest problem is to secure a large supply of help capable of building his car. Such help is located in the large industrial centers and it is difficult to induce it to move; so, regardless of whether these large



cities are in the ideal position or not, the automobile manufacturer is almost compelled to accept the location that has been selected by others, and he finally locates his shop in Detroit, Cleveland, or some other large city where many mechanics are employed. He does this because he knows that mechanics congregate where work is known to be plentiful, and also that they readily move from shop to shop. This latter fact is an advantage to him in the beginning, but later is a disadvantage, since it causes a large labor turnover.

**9. City Versus Country Locations.**—Many manufacturing plants of large size are in the business centers of large cities, where they can grow only by building higher in the air. They began probably with much more room than any one dreamed they would need, but when they reached their boundaries the plant was much too expensive to move, and yet was worth what it cost only if the concern kept going. However, in many cases there are great advantages in being centrally located, and these advantages, especially ease of hiring help, may overbalance the high cost of plant and difficult access to materials. Very few of these centrally located plants have adequate railroad facilities for heavy work or for handling either raw materials or product in carload lots. If, however, the work is light, such as the manufacture of paper goods, boxes, valentines, etc., it may be profitable to have the shop near to its employes and pay more for handling the supplies and shipping the product; in general this is true wherever women are employed, except, possibly, in the mills where whole families are taken on at a time. A very considerable number of young women work for spending money rather than for a living. They live at home, have everything that they need supplied, and can pick and choose their jobs. They will not go out into the country from the city; because, if they do, they find the quiet and absence of life painful.

Shops having seasonal work that can be done in the winter can profitably locate in the country where they can draw the farmers who would otherwise loaf all winter or else go to town

for jobs. Men who work in the outlying districts during the warm weather are not likely to be any more happy in the city in the winter than are the city people who go out into the country to work. The country people in the city miss the home cooking and the physical comforts which they get on the farm. If they are reconciled to city life, they want to stay there the year round. In recent years the rush to the cities has rendered still more difficult the problem of filling the shops in the country. Many persons deplore this tendency of people to congregate in the large centers, but there are good reasons why it is necessary, the principal one being the fact that there is not room for so many on the farms. Much of the agitation about lack of help to plant and get in crops is unjustified, as the great increase in farm machinery is making it unnecessary to have so many people on the farms, so they are really being crowded into the city by lack of employment outside. A man with a tractor is nearly ten times as efficient as a man with a pair of horses, when the plowing is going on. All this has made it necessary that the man who goes out on a farm shall have capital enough to buy the needful equipment before he begins, if he is to make the farm pay. Therefore, the farm, as a business or as a place of employment, is much more like a shop than ever before.

10. All the signs point toward the necessity of placing shops on the outskirts of large cities, except in cases where other considerations than obtaining help have to control. This is because desirable help simply will not go far from the excitement and interest of city life. They are willing to live outside up to about an hour's travel from work. That is, with the eight-hour day they are willing to spend two hours in traveling to and from work. The shop can be located about a half-hour's ride from the center of the city and the other half hour be allowed for distribution of help to their homes; or the shop can be located an hour's ride out and be surrounded by the homes of the employees. However, in this latter case, the fare for the hour's ride must be very low, indeed.

The questions regarding the actual housing and transportation of help are taken up further on; so that it need only be said here that in some cases approximately as much capital is required to provide housing as to conduct the business. Expenditure for housing can be avoided if the shops are near enough to large centers of population so that easy, quick, and inexpensive transportation can be provided. It should be borne in mind, however, that when all or nearly all of the employes live within a few minutes' walk of the shop, a smaller rate of wages satisfies their needs and desires than if the larger number have to travel by train or trolley and bring or pay for a lunch in the middle of the day. However, merely providing housing for a selected group, or providing it for the few who are unable to get accommodations elsewhere, is not enough to affect the pay roll at all favorably. Wages, as will be explained further on, are determined by the rate demanded by the highest priced men that the concern must have in order to get the production found profitable. Consequently, unless housing is provided nearby for every one who would like it, there is no financial advantage in providing any. Anything that falls short of this contributes only to the unfavorable side of the balance sheet.

**11. Industries That Thrive in the Country.**—It has already been explained that certain things must be done at the source of supply, as for example the canning of fruits and vegetables, the calcining of aluminum ore, smelting of copper ore, etc. Certain industries that can be curbed in their growth and which employ women largely, thrive in the country; as, for example, the manufacture of straw and felt hats, underwear, neckties, etc., and some of the minor textiles, such as hosiery. These businesses do well until the point is reached where they need the services of more girls than are available in the immediate vicinity and they have to reach out and induce others to come into the town to fill the shops. Any legitimate means of aiding the healthy growth of the community are helpful, but bringing in individuals with no family ties is conducive to poor relations with labor and is very apt



to raise the rate of wages, which must necessarily be paid to all alike.

**12. Locations Determined by Power Supply.** —Many industries are dependent on low-cost power. The aluminum industry has already been mentioned, but the textile industries are equally needful of steady, dependable power at low cost. The materials for textiles are easily transported, the market is everywhere, labor will follow the factories seemingly anywhere, whole families are often employed, and a large proportion of the workers do not require much education or intelligence.

The cheapest power is that of water when conditions are favorable. To be sure, wherever there is water-power for sale in small quantities, as when distributed by power companies like those at Niagara, there is not much difference between the price charged and that charged for power derived from coal, for in such case the difference goes into the profit of the power company. But, if the pond and dam are owned by the factory, the actual cost is very little more than that due to depreciation and interest on the cost of the equipment and dam.

The desirability of steam power is dependent on the ease with which coal may be obtained. The numerous troubles in the coal fields, and the uncertainty as to whether coal can be assured at the factory at any price, make water-power attractive. Because of the ease with which power may now be transmitted for considerable distances by transforming it into electricity and back again at the distant end of the transmission line, the worth of a water privilege is now greater than ever. If, however, the first cost of a water privilege is too high, it is entirely possible that steam may be the cheaper.

Steam is also made by burning crude oil instead of coal. The increasing tendency toward higher prices of fuel oil and the uncertainty in regard to some of the sources of supply give an element of risk to installations for oil burning. Fortunately, most installations of this kind can be made so that, without radical changes in the boiler setting, they can be changed to burn coal in a few days at the outside.

**13. Importance of Transportation Facilities.**—If the manufacture of watches is contemplated, consideration of transportation facilities for either materials or product is hardly necessary. A freight car that might bring a hundred dollars worth of iron ore to a blast furnace would take away millions of dollars worth of watches.

If, however, the transportation problem is a large factor in the business, as in the case of blast furnaces, machinery, textiles, shoes, etc., then a location on a branch of a large railroad system or where water freight is available, is important. It is not so much the size of the line that runs past the doors that counts, as it is the facilities for getting goods clear through to the purchaser or of receiving materials direct. There is also an advantage in being near a junction point where there is a choice between a number of roads; not that any competition can be aroused between them as to rates, but because much better service is assured. More than that, in times of embargoes due to labor disturbances, or tie-ups due to storms or any other cause, it is usually possible to get goods in and out by some route.

Water freights are normally much less than rail, and have a distinct advantage where time is not an important element. If the business is largely export, proximity to a port that handles shipping to all parts of the world is a great advantage. The effect of such conditions is seen in and around New York City, where a great many manufacturing concerns have come, attracted by the convenience for shipment to any part of the world, and also by the ease of receiving shipments of materials from every source; for here transportation to and from all parts of the world can always be obtained. It does not follow, however, that all exporting should be done from the port of New York. From the point of view of the country as a whole, it is likely that it would be better if all the good harbors along the Atlantic coast had a share of the trade proportionate to their ability to handle it.

**14. Dependent Industries.**—Certain shops are limited in their range by the necessity of being near certain other

shops. Rolling-mill machinery is usually built near rolling mills, though a notable exception occurs in New England. In other cases there is no apparent reason for proximity. For example, Ford accessories are sold wherever the cars go; there is no need that they be manufactured in Detroit, yet it is natural that they should be. Coopers can often profit by putting their little shop next door to a large one that uses their product. Small shops just starting in almost any line often do very well to take a small shop close to the factory in which the new owners were formerly employees. By so doing they are apt to pick up old customers of the large company, who are disgruntled for the time being over some trivial occurrence, and who would probably go home and cool down and forget all about it if the other shop were not right there to catch them while they are still angry.

**15. Proximity to Local Markets.**—Certain manufacturers of perishable goods, as in the case of restaurants, hotels, bake shops, and to some extent candy shops, are influenced in their location by the question of proximity to their respective customers. It is not enough for them to locate in a prosperous city; they need to be on the street corner where foot travel is the most dense, and on the ground floor, so that their customers will not have to go up steps to get to them. Of course this can be attained in a candy shop, or a bake shop by having the factory elsewhere and only the store located in this very desirable place. Hotels and restaurants, buying flour, vegetables, meat, etc., are in a position to profit by railroad connection; but it is very seldom that good facilities of that kind can be had where the greatest crowds pass, so this factor is almost always sacrificed to the more important one of securing customers.

**16. Financial and Other Considerations.**—Many cities, observing that growth comes with manufacturing, offer inducements for new business. These inducements may be in the way of stock subscriptions, remission of taxes for a time, or they may be the more legitimate ones of low per-



manent tax rate, good streets, water, fire, and sewerage departments, good schools, and housing.

Offers of financial assistance should be carefully scrutinized, as there is too often a string attached in the form of added paid officials who may be found to be hangers on of some town official; or it may be that it is expected that the taxes remitted the first few years will be more than made up in after years by excessive valuation, on account of similar remissions made to other new comers. It should always be borne in mind that every new business coming to a small city or town induces more jealousies than it would in a large place where it might grow unnoticed. The very people who are most anxious to see the town grow are sometimes the first to criticize the new firm for taking the help which "belong" to a concern which was already there.

Often the reason why the town can make great concessions is found to be the possession of a shop building which the people of the town had built for another concern that failed. This building is offered for rent at a figure that will bring back all the money actually subscribed in a very short time. This is a legitimate thing to accept, if the building is adapted to the purpose in view; but if any extensive changes are needed, or any changes that will not be made by the owners, it is a wise thing to weigh very carefully the advantages and disadvantages beforehand. Again, almost any town giving financial assistance will expect to have a representative on the board of directors; and while that seems a very reasonable and moderate request, it is the same thing in many cases as opening the books and all the hopes and ambitions of the company to the entire public.

**17. Small Beginnings.**—From what has gone before, it seems that it will be wise for a small concern that has hopes of becoming a large one to exist in hired quarters as long as possible without having to make a lease that is of prohibitive length. There are, of course, very decided objections to using other peoples' buildings; for alterations of any moment have to be a matter of agreement with the owners or else be lost

completely when the premises are evacuated. However, in the course of the growth of any industry, there usually arrives a time that is very critical, a time when the owners can see nothing but success ahead, but when banks and financiers do not share their hopes. That is the time when the need of enlargement is most apparent to the owners of the business and when it is the hardest to accomplish. Then, if the capital of the company has been kept for machinery and working purposes and is not tied up in buildings, there is a great deal more chance of getting assistance from a distance when the home-town banks will not help at all. There are always opportunities to use money in any growing business, and care should be taken not to tie up too much in land for further expansion, but which may not make any returns for years to come, or in owning mines or mineral deposits to make sure of future materials. All these factors should receive careful consideration and whatever money may be available should be used in such a manner that it will bring the greatest returns in the long run.

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## BUILDINGS

**18. The Purpose of Buildings.**—The object of the buildings is to provide a shelter for machinery, equipment, materials in process, men, and finished product. It is necessary that the building shall furnish a suitable foundation for all the equipment, that it shall be convenient for the processes of manufacture, and that it shall be well ventilated, dry, or as dry as the processes demand, and light, if the processes allow it, as they usually do. Any money spent for things in excess of these demands is put into the building for purposes of appearance, or because the bank that holds the mortgage insists on a fine well built building or for some reason apart from production.

**19. Permanence.**—Building for all time would seem more sensible if it were not for the sorrow with which we contemplate a shop doing business in a building built for all time,

even only 30 or 40 years ago. And we cannot be very certain that our own look into the future will be any better than was that of the people who built a short time ago. So many things change, and engineering is going ahead faster now than ever before, that we really can have less confidence than our fathers had as to the future.

TYPES AND METHODS OF CONSTRUCTION

**20. Types of Buildings.**—For factory purposes, three distinct types of buildings are in use. These are: The single-story building with *saw-tooth roof*, Fig. 1; the *open shed*, with a traveling crane and possibly a gallery on one or

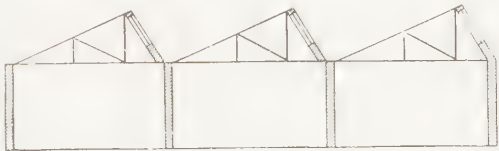


FIG. 1

both sides, Fig. 2; and the multistory *loft building*, Fig. 3. Each of these types of building has a distinct use, though the work done in a loft building can usually be done in any other type, while that done in either one of the other two types very often could not be done in the others. Hybrids of these types occur, as for example, that shown in Fig. 4,

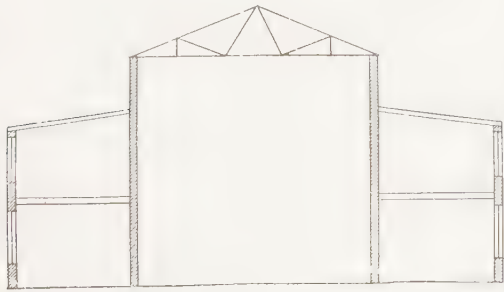


FIG. 2

where the lower story of a loft building is made high enough to permit the use of a traveling crane which would ordinarily be installed in the shed; or a monitor section, as in Fig. 5, may

be put in between saw-tooth roofs; or a saw-tooth roof may be placed on top of a loft building or on top of the galleries of a shed-type building.

21. The **saw-tooth-roof building** is adapted only to places where land is available and not so expensive as to make it desirable that area shall be gained by building up into the air. It affords as good a foundation for heavy machinery as

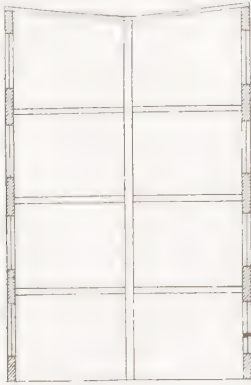


FIG. 3

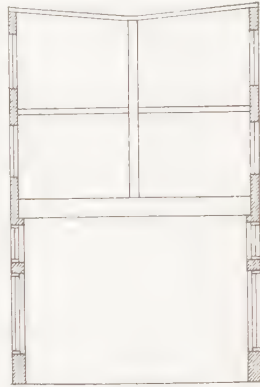


FIG. 4

can be had anywhere; that is, as good as the land on which it is built affords. It is easily heated, and has another advantage in that it is easily supervised, provided the management does not allow many tool rooms and other partitions to be

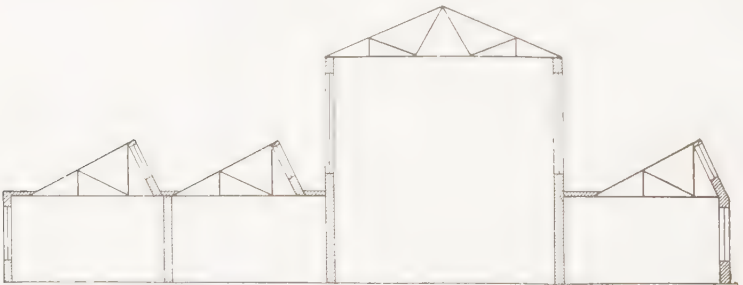


FIG. 5

put in so as to cut the space up into small rooms. It is harder on the superintendent and others who must cover the area, as the distances to be traveled are considerably greater than in the case of the loft building.



The saw-tooth-roof shop, all on one floor, gives the most ideal lighting that can be had. It is easily adapted to northern climates by making the lower point of the saw-tooth a large sloping gutter, as shown in Fig. 6, so that there is no danger that water from thawing snow will back up over the level of the bottom of the sloping sash.

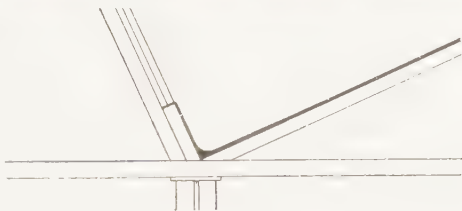


FIG. 6

**22.** The **shed** gives the largest space with clear room free from posts. Its floor area can be most efficiently used, as very little space for passages need be left for trucking; for most large work is carried overhead by means of traveling cranes. It is a fact that cranes really increase the effective floor space, even as much as 20 per cent. in some cases. However, they do this at the expense of a costly crane that is not always used with good judgment. It is nothing unusual to see several men stand still and watch a 20-ton crane pick up a 50-pound box and carry it up the floor. This is not so inefficient as it may seem; for, if the floor is used to advantage and no space left for trucks, then it may be that this is the only way that the job could be done. The error, if any, was in providing necessity for the removal of a small box from such a floor at all.

The shed type of building is not easy to heat, as the warm air has a tendency to ascend to the peak of the room and leave the workmen cold.

**23.** The **loft building** is the result of high land values, and is made profitable by the use of elevators. The shortness of the distance from one part of such a building to another is a great advantage in light manufacturing that cannot follow a straight line. For example, as shown in Fig. 3, in the loft building the distance from the center of one floor area to that of the next is only the height of one story, while if the floors were laid side by side on one level, the distance would be the

entire width of the building. The loft form of construction therefore saves a great deal of movement of goods in process of manufacture; and as movements by elevator are much more quickly made than are the longer horizontal ones, a considerable saving results if a good freight-elevator service is installed. The loft building is, however, limited as a foundation for machinery. Usually, city ordinances call for a strength of floor to carry about 250 pounds per square foot. This weight includes the machines, the material in process, men working on it, and any emergency load that may be required from time to time. Sometimes the actual strength is made sufficient to carry up to 300 pounds per square foot; but this involves a very heavy building, with many posts that obstruct movement and always seem to come just where a machine or a shaft or a belt should come. The posts on the ground floor take up a great deal of space and obstruct the light just where it can least be spared, as they must be large enough to carry all the floors above them.

Usually, the roof over a loft building is nearly flat. In the city, it is made with a pitch toward the center, as shown in Figs. 3 and 4, where pipes carry the water to the sewer; in the country, the pitch is usually toward the walls. The roof is usually covered with tarred felt and gravel in a manner that has become standard.

The loft building is the most easily heated of any; for the separate floors can be heated independently, as very little circulation of air takes place through stair wells or elevator shafts.

**24.** Both the shed and the saw-tooth-roof buildings can be built in a more temporary way than can the loft building. The latter requires heavy posts or bearing walls, as those below have to carry everything above. This strength of walls and posts is the principal reason that the cost per square foot of floor space or per cubic foot of capacity is greater in a loft building than in buildings of the other types. This extra construction cost is partly offset by the fact that a roof the size of one of the floors covers all of them in a loft building,

and the area of the foundation is the same regardless of the number of floors. The cost of the foundation increases comparatively little with the number of stories, unless the building is situated where piles have to be driven or where a deeper excavation is necessary for a heavy building than for a light one. The latter condition would exist where a stratum of good gravel is sufficiently firm to carry a single-floor building, but is underlaid by a layer of peat, loam, or other soft material, that would make the erection of a tall building unsafe unless piles were driven or the foundation carried down through the soft material to some solid stratum below.

**25. Buildings as Foundation for Machinery.**—Some manufacturing requires such light equipment and so little of it that any building that will hold the employes and the materials in process, and keep out wind and rain is sufficient. On the other hand there are lines of manufacturing in which very slight vibration of the building is detrimental to good work of the machines. For example, precision machinery requires a building as near vibration-proof as possible. This quality is not synonymous with strength, for a steel-frame building may have an excess of strength and yet sway appreciably in a wind. A brick, concrete, or stone building will be less apt to show vibration than one with a steel frame. Reinforced concrete seems to be the ideal structural material for loft buildings, because the mass of the building absorbs the vibrations set up by the operation of machinery. It is also possible to make the building as strong as may be desired or to make one portion of it extremely heavy and another part light. However, concrete is not so well adapted to very light construction, and consequently is expensive for the lighter forms of manufacturing buildings. Walls of concrete can hardly be made less than 12 inches in thickness with certainty that the mixture of concrete will be well tamped into the forms, while a great deal of brickwork is laid up in 8-inch thickness only, and wooden walls can be made lighter still. A concrete building, however, is very effective in appearance if built with panels, the interior of each of which is glass with

the exception of a thin wall of brick about 3 feet in height at each floor. Such a building can also be made with steel center posts and floor girders and a wooden floor, thus making a light building that has much of the advantage of a concrete building and is less expensive than the lightest all-concrete structure that would be practicable.

**26. Floors.**—The objections most often raised to concrete floors is that they are cold, that is, that they abstract heat from the men's feet; also, that they are hard and unyielding and tire men more than do the more resilient wooden floors. Just what part of these objections is due to psychological reasons and what part is fact, depends on the men to a great extent. Men accustomed to walking in plowed fields and dirt roads find themselves very tired the first few days they travel on city sidewalks. Also, men who have always been accustomed to walk on brick or granolithic sidewalks find themselves extremely tired at night if they attempt to do as much walking in the country as they do regularly in the city. This is partly because of a difference in the muscles brought into play. The city man develops a very strong muscle down the front of his shin unless he habitually wears rubber heels, in which case this muscle may remain as undeveloped as a farmer's. The farmer has to use the muscles of the calf of his leg much more than the city man does, because he is always climbing up out of furrows or other depressions that he has stepped down into. In the city the farmer has to develop his shin muscles or else buy rubber heels. If every one would wear rubber heels, there would be little complaint about the hardness of concrete floors. The trouble about the cold is undoubtedly real in the cases of people with rather sluggish circulation of the blood, and especially if their work is largely brain work, which causes the blood to flow to the head rather than the feet.

The real test of concrete floors, however, comes not in the number of opinions of prejudiced persons, but in a comparison of the actual labor turnover in plants having concrete floors as against similar plants having wooden floors. This has



been tried out, and so far no added labor turnover has been reported on account of concrete floors. In fact, the labor turnover in certain instances that have come under the writer's observation has been less on concrete than on wood. This may be, however, because the concrete buildings, being modern, were so much better lighted, the elevator service was so much better, and in all ways they were so much more desirable to work in, that their general advantages more than offset any objections as to the floors.

**27.** Wooden floors for loft buildings are very acceptable for moderate loads. They are usually of the so-called *slow-burning* construction with heavy hard-pine timbers, supported on wooden posts of substantial size. The timbers are spaced, usually about 8 feet center to center, and on them are laid 3-inch or 4-inch hard-pine planks with tongue and groove or spline between them, and over the plank a layer of 1-inch flooring, usually maple. Such a floor is resilient and is safe for loads up to 150 or even 200 pounds per square foot. A still stronger floor is made by using 2-inch planks of any desired width laid on edge and each spiked securely to the next.

The top flooring, or wearing floor, may be either square-edged or matched, according to the expected wear or the need for an especially smooth floor. The matched flooring will give much the smoother surface at the beginning; but if there is much wear it is more expensive to cut out a section and relay it than if it were of square-edged stock. The square-edged flooring costs less, as the waste due to the tongue and groove is eliminated and usually a poorer grade of lumber is used. The labor also is less, as the square-edged flooring can be laid without the trouble of driving up each joint.

**28.** In one-story buildings, concrete floors are very commonly used; though a wooden floor made by bedding hemlock plank in a tar-and-gravel mixture, with the usual maple flooring laid over the plank, will carry very heavy loads, and appears to last almost indefinitely if not subject to floods from time to time. However, at the usual price of lumber

it is doubtful whether such a floor costs any less than concrete. When machinery that is too heavy for the floor is to be installed in a one-story building, the ground is excavated at the proper places and concrete foundations of the necessary weight are made.

**29.** In galleries beside a crane way, floors similar to those described for loft buildings are used, except that, as such floors are almost always used for very light work, they may not be so heavy. The steel-frame construction is cheapest for buildings having a wide span, such as is required by a crane way; therefore, it is customary to carry the steel-frame idea through the side bays, and the wooden floors of the side galleries are usually supported by steel girders or I beams to which 2-inch or 3-inch nailing plates are bolted, and the floor is spiked to them.

**30. Construction in Relation to Fire Risk.**—In designing any industrial building, the risk of damage by fire should be carefully considered. There are three types of construction, as follows: One, the *slow-burning*; another, the *fireproof*; and the third, the *partly non-inflammable*.

**31.** The **slow-burning construction** has an outer wall of brick, stone, or concrete, with large window spaces, which may be filled with windows in wooden frames. Wooden floors are laid, as already described, on heavy hard-pine timbers, widely spaced so that there will be no pockets into which it is impossible to throw water in case of fire. The whole construction is inflammable, but the area exposed to the air is so small compared with the bulk of the timbers, that burning proceeds very slowly after a protective coating of charcoal is formed. Such buildings look very bad after a fire; but they usually stand, unless the weight of water held on the floors and added to the load already there is so great as to break them down.

**32.** **Fireproof construction** is made up of reinforced concrete, or of steel fully covered with concrete so that none of the metal that might be exposed to the heat of the fire is

carrying any weight. Such a building usually has steel window frames, with wired glass on the sides near to other buildings. It can only burn as the contents catch fire; and it requires a long fire and extreme heat to affect the girders unless the concrete covering spalls off the girders which it should protect.

**33. The partly non-inflammable construction,** which is the unprotected steel-frame construction, is very largely used. In case of fire, the steel columns, girders, and trusses assume the most weird and fantastic shapes, the whole thing comes down, and it is an almost total loss, as the cost of cutting up the mass, even with the oxyacetylene torch, is equal to the scrap-iron value. However, this construction is likely to prevail until some practical method of fireproofing trusses is discovered. Such trusses are a necessity over crane runs, and it is necessary that the crane ways be supported on suitable columns. A compromise is often effected by using reinforced-concrete columns for the crane ways or else having the steel columns liberally encased in concrete; but the roof trusses are still left open to fire.

**34.** How much money should be invested in buildings and how much spent for fire protection and how much for insurance are matters for individual study in each case. If the enterprise is untried, if it is something in which a large present profit is expected and the future is problematic, then a high insurance rate is not necessarily an evidence of poor planning. Only the most stable and settled industries can truly afford the fully fireproof type of building.

**35. Sprinkler Systems.**—An expedient for reducing the fire risk without adding greatly to the cost, is the use of automatic sprinklers. These deluge the seat of fire with water, and in by far the larger number of cases cut down the fire damage to almost nothing. The water loss is much more likely to be the larger. The expense of installing a complete sprinkler system is much less than the additional cost of building a fireproof plant. The saving in insurance alone

will usually justify its installation, and the added security will pay good dividends.

**36. Relative Production in Different Types of Buildings.**—Certain types of buildings are best suited to certain classes of work. The loft building is adapted to miscellaneous business in which the flow of work is more or less crisscross; that is, work where, though the principal part of the material follows a consistent line from raw material to finished product, many collateral parts have to cross and recross this line. For example, the heaviest casting of an engine lathe may go first to the planers, then to a drill, then to a horizontal boring machine, and then to the erecting floor. There will, however, be other parts, as for example the head-stock, which will go to the milling machine, to a drill, to a planer, back to a drill, then to a planer, and finally to the erecting floor. If the shop is a large one, each department may build a portion of the machine and have all the machinery in a straight line to do each job; but ordinarily it is found advantageous in such shops to put all the planers in one group and all of each of the other tools in similar groups, in order to permit of giving each group the expert supervision that brings out the best work. With the last-mentioned arrangement, a certain amount of crossing of lines of flow of work is inevitable, and the loft building is probably best adapted for such conditions; because the total distance to be traveled from any one part to any other part of the building is the minimum, as the elevators make possible a short run from the center of one floor to the center of another.

The saw-tooth-roof shop should ultimately assume, as nearly as practicable, the form of a square, so that the shortest lines of travel may be maintained, not only for the flow of material but of travel for supervision.

The shed type of building with traveling crane is apt to stretch out to a great length, with sometimes three or four cranes on the single long runway. This form is advantageous for the handling of material in shops where everything can travel one way; but the work is hard to supervise, as the lines



of travel for every one and everything are up and down the length of the shop.

### HEATING AND VENTILATING

**37. Methods of Heating.**—One of the functions of any industrial building is the protection of the workmen and the materials in process from the weather. The great bulk of all manufacturing, the world over, is done where artificial heat is necessary for a considerable part of the year. Consequently the method of heating is of importance, if for no other reason than that employes look out for themselves so far as possible and try to get into the most comfortable quarters they can for the winter.

The forms of heating most in vogue for shops are: Direct steam or hot water; indirect steam with blower system; forced circulation of hot water.

The direct-steam system at comparatively low pressures is most favored in loft buildings, because by this system it is possible to heat some portions of the building without heating the whole of it, and because the first cost of installation is kept low by the short steam mains, and because there is usually a basement in which the heating apparatus may be installed so that it is possible to use a gravity-return system.

One-story shops are more likely to be heated by the indirect system where the air is warmed by blowing it over a nest of steam coils and then led by means of galvanized ducts to the various parts of the room. These ducts can be carried overhead and be made to discharge either horizontally or obliquely downwards at a sufficient height above the heads of the workmen so that they do not feel a direct current of hot air. When direct steam heat is used in one-story buildings, steam coils are usually arranged along the walls under the windows; but if the shop is large, this arrangement becomes entirely inadequate and it is necessary to resort to coils hung overhead out of the way or else to use a combination with the indirect system just described. When coils and radiators are used in a variety of positions, there is often a great advantage in using one of the so-called *vacuum* systems, where the returns

from the radiators are brought together and connected to a vacuum pump, thus increasing the rapidity of circulation of steam without raising the pressure and without making the difference in temperature between the radiators and the room so great as to make the heating inefficient.

Hot water as a heating medium is not often used in shops; it has certain advantages, but the radiators are necessarily large, because the water cannot be safely maintained at much over the boiling point. Sometimes a forced circulation of hot water is resorted to, thus cutting down the cost of installation by allowing smaller pipes and radiators. If the cost of power to run the circulating pump is not too much, then this system of heating is very satisfactory.

**38. Method of Ventilating.**—Heating affects production in some plants where certain uniform temperatures are necessary in order to keep the materials in good workable condition, as for example in the cotton industry; but in general the principal object of heating is to make the shop attractive to the workmen and keep them well and able to continue the work. For this reason, heating should not be considered without taking into account the ventilation. In the great majority of shops the ventilation is dependent on the agreeing of the employes themselves to have the windows open a sufficient amount to give the needed change of air. The result is that the weakest win, and those who declare that they will catch cold if the windows are open even a fraction of an inch, rule; and the windows are closed from fall to summer. Those who suffer from lack of fresh air are seldom so self-assertive as are the sufferers from colds, though in the aggregate the tight closing of the windows undoubtedly causes more suffering than if reasonable ventilation were provided. For this reason, it is desirable to provide means for ventilation that are neither accessible to nor noticeable by the employes.

**39.** The indirect steam-heat system furnishes a good means of ventilation, and one that is not in any way under the control of the employes, except as some very hardy person

may venture to open a window. The air for circulation is taken from some outdoor source where there is a minimum of dust, and is distributed through the ducts of the heating system. If a comparatively dustless source is not convenient, the air may be run through a washer. Often in cold weather air from the shop is run through the washer and circulated again, thus saving coal. Discretion should be employed in reusing air, as under some conditions the air might contain impurities that would not wash out or it might be impoverished. It has been thought that reused air might show accumulation of bacteria, but experiment appears to indicate that with proper washing such is not the case.

#### EQUIPMENT

**40. Sources and Varieties of Equipment.**—Each specific business has its own equipment, so that the subject can be discussed here only in respect to general principles. The purchase of equipment depends on the nature of the business. Since ancient times the blacksmith has been reputed to be the one craftsman who is able to make all his tools himself. Today, however, even though he can make all the tools he needs, he finds that he can earn more money during the time that he would spend making them than it costs to buy them. At the other extreme from the blacksmith, are the various businesses in which no manufacturer expects to take any part in the manufacture of his machinery, and in which it is quite unlikely that he could do much if he wished. Such, for example, is the textile business, in which manufacture is extremely specialized, so that the mill owner buys his looms of one manufacturer, his finishing machinery of another, and so on, but never thinks of such a thing as building them himself.

A great group of industries is supplied with equipment by the machine-tool and wood-working machinery manufacturers. These people supply a definite line of machinery with which any of the usual operations in wood or metal work can be done. They also will build special machinery adapted

to the product which their purchaser wishes to make; but often the purchaser of machinery of this kind will have some special machines which are secret, or which he hopes to keep secret, and so he runs a small machine shop of his own, using machine tools for the manufacture of his own special machinery.

Also, there are shops whose work is so specialized that no one else is likely to demand anything similar to it as, for example, the spool and bobbin shops, the manufacturers of horn and celluloid combs, etc. The makers of such goods for the most part buy their equipment from manufacturers who make nothing else and who give each purchaser the benefit of their experience with all the troubles that many shops have had. Occasionally a maker of some such goods will develop ideas of his own and will enter into the job of designing and making his own special machinery; but the shops making such goods are so likely to be small, that this seldom happens. Then there is still another class of manufacturers so specialized in their work that no one can afford to make a business of supplying them with machinery that is at all standardized. These are the makers of newly patented articles that have not yet come into common use and which have not yet incited other people to dodge the patents. Such manufacturers have to design their own machinery and experiment with it until they either stumble on something usable or else enlist the services of some expert designer who sees the opportunity to make a future profit and is willing to do the experimenting. In this class of manufacturers have been the makers of many of the notable inventions that have since become staple products, such as the telephone, wireless, the phonograph, etc.

**41. Investment in Equipment.**—In the early stages of most small businesses, the simplest and most needed machinery is bought, and for a long time all the surplus that can be squeezed out of the business is spent in getting more and better equipment. There comes a time, however, when the entire question of investment in land, buildings, and equipment has to be considered. Nearly every business does a



considerable amount of borrowing from banks. A business concern can borrow moderately from savings banks on its real estate. It can borrow more on a loft building situated in the business district of a large city than it can on any other kind of manufacturing property; it can borrow less on buildings of the shed type with traveling cranes, simply because the bank must look at the value of the building at forced sale. A loft building can be cut up into small rooms and used for many purposes; the other type is useful only for certain kinds of heavy manufacturing. Consequently the pressure from the financial part of the management is to use the loft building whenever possible. However, the equipment must for the most part be owned outright. It is seldom that banks consider the inventory of the machinery and tools as a basis for loans. They want to make their loans, other than those on the buildings, on a basis of quick assets, such as bills receivable and materials in process of production, on which they can realize quickly in case of necessity. As a security, machinery is looked on by banks as likely to be a dead loss. In many cases they are right, because the highly specialized machinery used by many manufacturers is of no interest to their competitors, except as a curiosity. In many lines of business, progress has been so rapid that no one set of machinery has had a chance to wear out before something far superior has come up to take its place. Under such conditions, a user may find it to his advantage not to insist on weight of parts and refinements of workmanship such as would be proper for standard machine tools, since he is likely to find it profitable to throw away his equipment and buy new much oftener than do the machine shops.

From this it will be seen that the amount of money that should be sunk in equipment depends greatly on the rapidity with which invention has proceeded in the past. It is never safe to assume, because great progress has been made, that it has come to an end; for it almost always seems as though the reverse is true. Things that have been much improved in the past are being still more rapidly changed, while things that have stagnated in the past are beginning to show signs of change.

It is desirable to keep these things in mind, because the engineering profession is inclined to look at the present dollars and cents cost of production and often to overlook the loss that must be taken whenever progress demands a change of equipment. Many factory concerns have found their business stagnating because their machinery was built for all time, and was so expensive that when the time came for it to be scrapped they could not see their way clear to take the loss. They did, however, take the loss, sometimes many times over, in the lack of increased production as compared with their competitors.

**42. Arrangement of Equipment.**—There are two quite dissimilar methods of manufacture, the choice of which is determined by the nature of the goods. One is the **continuous process**, where the product goes along in a straight line, and various operations on it are performed and the product comes out at the further end of the building ready for shipment. This straight line is not necessarily a physical line, and it may have subdivisions or it may have tributaries. For example, in the manufacture of steel wire from the billet to the finished product, there is first the billet mill, in which by repeated passes of the billet back and forth through rolls it is reduced to about 4 inches square. This is then chopped up into about 4-foot lengths and reheated, run through a continuous mill, and comes out as a rod about a quarter of an inch in diameter. It is then shifted to draw benches and drawn down to the desired diameter. It is then ready for shipment, unless it requires galvanizing or some other collateral process. In all of these processes the manufacture has gone ahead; but after the billet mill, the bars may have been distributed to two or more rod mills, and after the rod mills the rods may have been distributed to a number of draw benches, as in each case the billet, which was perhaps 6 feet long, may easily make a hundred miles of small wire.

**43.** The other principal method is the **intermittent**, or assembly, method. In this, the product is made part by part, or unit by unit, and finally brought together in a completed

whole. Some of the parts may be made and stored for a long time; some may be made especially for the particular unit that is to be sold. A notable example of this kind of manufacture is the engine lathe. A great many of the essential parts are small and capable of being made on automatic machines for a very much less cost than if made one by one; such, for example, are the bolts and nuts, capscrews, studs, and gears. These can very easily be made on the interchangeable plan with reasonable tolerances. They may be made in lots of a hundred or a thousand and kept in storage until the time comes when they are needed. The machines on which these parts are made do not stand idle while their product is being used up, but are put to work on other similar parts, so the continuity of operation is broken up. Other parts, like the aprons, feed works, compound rests, etc., are made in quantities of from a dozen up to perhaps fifty, and stored away. Then the large member, the lathe bed, or the ways, is made, sometimes in small lots for the most used lengths, sometimes on single orders for lengths not commonly called for. For example, a manufacturer of 18-inch lathes will usually try to have 8-foot and 10-foot beds in stock ready for shipment, or at least for immediate assembly; but if an order comes for a 14-foot or 16-foot bed, he will have to wait to have a casting made. The final assembly of a lathe of any length consists in putting the bed on to standard stock legs, fitting to it the headstock and tailstock brought from stores, scraping on a carriage and fitting an apron both brought from the stock room; then, while this has been going on, a lead screw and feed-rod have been made, if the machine is of special length, or brought out of stock for the ordinary lengths, and they are fitted; the machine is then tried out and is ready for shipment.

44. A combination of the intermittent and the continuous processes is used to some extent; notably in the manufacture of some motor cars, the sales of which are large enough to justify it. In this case the various parts are made and gradually assembled in something like the outline of a tree,

Fig. 7, so that the raw material comes in at each of the tips of branches, has the necessary operations performed on it, and is assembled to the next part at the juncture of the branches. The assembled units are then attached to the main stem where the branches meet the trunk. In this process, the main body of the car, beginning with the frame, or chassis, moves slowly down the shop, and as it passes the opening from each wing of the main building the proper parts to be attached at that point come out from the shop in which they were manufactured and are ready for assembly. The parts from each of these shops, however, may have had a similar method of assembly; for example, the engine has already been assembled by the same process.

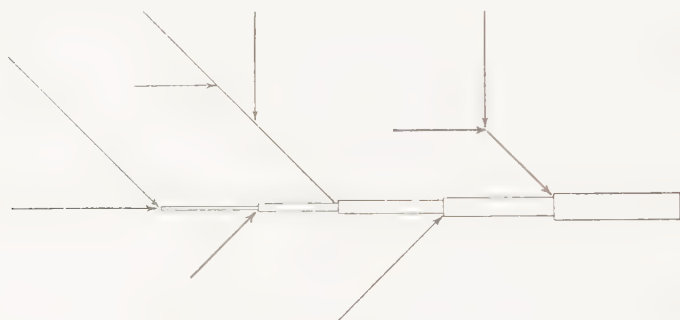


FIG. 7

The advantages of this method is that there is not so much money tied up in idle stock waiting for it to be needed. However, it is obvious that it is applicable only where there is assurance of a very large flow of work, such that the most trivial operation that is performed in the whole works will keep at least one man fully busy. Then other operations become simply matters of keeping a proportionately larger number of men on each individual job. This method has a disadvantage that must be weighed along with its advantages; that is, it discourages progress. Once the shop is arranged to carry out such a method of manufacture, it is very difficult, because expensive, to make any changes in the product.

**45.** A third form of arrangement of machinery is that of grouping machines of the same kind together. This is an advantage when the work is highly skilled or especially if it requires highly skilled supervision. For example, in a shop that requires a considerable number of gears, it is undoubtedly wiser to put all the gear-cutting machines together, so that the machine best adapted to the particular gear may be used. A complete equipment for a gear-cutting room comprises not only the standard rotary cutter machines for spur and bevel gears, but gear-hobbers and gear-shapers as well as bevel-gear planers. These machines scattered around a large shop become much less efficient than when grouped together with proper facilities for sharpening cutters, etc.

The grouping plan has been carried to the extreme of having all the machines of each different kind grouped by themselves, the product of each being sent to some other machine for the next operation, with the result that in a shop of that kind the routings of the work become an almost inextricable tangle.

**46.** Both of the intermittent systems require for their success a planning department to route jobs from one place to another and see that they are kept moving. A tangled routing, unless regulated by a planning department, can become very expensive in the increased amount of unfinished parts that are all over the shop. The continuous system of manufacture has the great advantage that there are practically no reservoirs along the way to be kept filled up, but the dams are all down and the stream of work can run along smoothly; whereas, in the other type of manufacture, there are innumerable eddies and backwaters in which material nearly done can stagnate.

There is nothing about the continuous system to prevent advantage being taken of a favorable market to stock up on materials. They simply go into a storehouse much less expensively built than the shop and remain there until required. When a stock is maintained all over the shop, it is mostly in a state of partial manufacture, and has cost something for labor, it occupies space adapted to manufacturing,



it is in the way and has to be moved from time to time, all of which is expensive. The best planning department is the one that produces the output demanded with the least value of partly manufactured goods in the shop.

**47. Equipment for Handling Materials.**—The size of building required for a given production is effected by the equipment for handling materials.

In a loft building, elevators are an absolute necessity; the stairways should be solely for fire escapes, as the elevators should be available for all transportation between floors. The location of the elevators depends on the use which is to be made of the different floors; but, in general, the center of the building is advantageous, as that has the least natural light and the space for the elevators and space for trucks waiting for them is least useful for other purposes. Definite lanes from the elevators to different parts of each floor should be provided and kept clear of all materials except those on moving trucks, otherwise the shop becomes so congested that costs go up on account of delays.

If the center of the floors must remain open, it is better to have the elevators at the center of one of the long sides of the room, as the lines of travel are then only slightly longer than if the elevators are in the center. As a general rule, if there is more than one elevator to serve a building, it is better to group them together; not merely because of economy of installation, but because then, when a man comes with a truck load of materials, he stands a much better chance of catching an elevator going the way he has to go than he does if the elevators are at opposite ends of a floor, in which case he will be likely to find the nearest one going the wrong way or not going at all.

**48.** Traveling cranes are an absolute necessity for many forms of work, and are therefore not a question of debate; however, there is often a question in regard to the arrangement of buildings served by them, as to whether there should be one very long and narrow building with several cranes all on one runway, or whether there should be several build-

ings parallel to each other, each having a separate crane, and all connected by a sort of transfer table across one or both ends. The latter arrangement makes possible a shop with less distance for executives to travel, and for the intermittent type of manufacture is much less likely to cause long lines of travel for materials in process. The long shop may be slightly less expensive to build, but it necessitates a transfer of loads from one crane to another if they have to go more than to where the next crane is in use; and this transfer is not much less expensive than the transfer to a transfer table, and then to another crane.

49. Other conveying mechanisms to be reckoned on in the construction of the buildings are tracks for industrial railways, belt conveyers, bucket conveyers for carrying bulk material from floor to floor, the various small, hand-controlled traveling cranes used for light loads and for serving machines, etc. These various mechanisms are made necessary by the methods of manufacture decided on, or else they are a matter of judgment in choosing between a low labor cost and low overhead charges. They are necessarily expensive, but manual labor is both expensive and unsatisfactory. Moreover traveling cranes of whatever type are not subject to especially rapid improvement, and they may be used and sold afterwards without the very great sacrifice that is made with more specialized equipment.



# PRODUCTION ORGANIZATION

(PART 2)

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## MANUFACTURING

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### MATERIALS

#### CONTROL OF MATERIALS

##### **1. Importance of a Dependable Supply of Materials.**

Control of raw materials of manufacture is important, so important that lack of that control is a constant menace to any firm's solvency. The shop may be so small and insignificant that no one is tempted to put any obstacles in the way of its purchasing whatever it wishes at a price somewhat below the retail market, but much above cost. For example, a small shop may buy its materials all manufactured, and merely assemble the parts, put its own name on the finished product, and market it. This is the way in which many automobiles are made. The engine is bought from one shop, the transmission from another, the body from another, and so on, until the company's own shop has only an equipment consisting of a welding outfit, a few wrenches, and a paint shop. Such a concern, however, is in a rather precarious condition; because the moment it appears to be making a profit there may be an increase in the price of supplies and parts. This increase may be perfectly legitimate; for some of the concerns from whom component parts are bought may

have given very low prices in order to help the new firm get a footing, and they may feel that it is legitimate for them to get a little larger share of the profits. Also, competitors of the first-mentioned firm are bidding against it and each other for the product of these manufacturers of parts, and the result of this bidding may be unexpected changes of prices that may seriously reduce expected profits.

At the other extreme from the conditions just described is the large concern that owns the original sources from which the principal materials it uses are derived. The United States Steel Corporation, for example, owns coal mines and iron mines, and undoubtedly many other sources of supply for things which it uses in lesser amounts. Such ownership gives them a commanding position in the business.

There are, however, dangers connected with the owning of such resources. For example, a firm using large amounts of copper might own copper mines. Such mines are usually deep and expensive to operate. If, then, their mines were of this nature, and other mines were discovered where equally good ore could be mined with a steam shovel working in an open cut and loading directly into standard-gauge cars, the worth of the deep mines would be reduced.

Also, unless a firm has abundant capital, it is unwise to tie up so much money in such property; for in times when money is scarce, banks are not likely to consider mines to be good collateral for a loan. In fact, it is probable that more firms have failed through trying to cover too much of the range of manufacturing operations than through failure of materials because of lack of their own sources of supply.

It is, of course, easy to show that there must be a profit made at each step of the process of manufacture, and that if all the processes are carried on by one concern, all these profits can be combined. Nevertheless, it must be admitted that specialization makes it possible to make a profit where none would appear to a shop doing all of the operations on the raw material. For example, a concern that makes crank-shafts for many different kinds of automobiles must necessarily get together a body of experience that no one automobile maker



could possibly get. Moreover, such a concern can afford to make tests of the billets offered, have specialized machines in its equipment, and take many advantages by which it will be able to make a profit at prices at which no profit whatever would appear if each automobile factory were to make its own.

2. Industrial history appears to bear out the advice to go slow in extending manufacture too far back from the finished product. Every possible precaution should be taken, however, to make business connections so that materials partly manufactured may be obtained regularly, and in such quantity as is needed. This may be accomplished by two means: in one case by beginning manufacture in the plant at one of the accepted stages, so that there will be many sources of supply and numerous bids may be obtained; the other is by making contracts with other firms, and they in turn with others, so that the effect of a continuous supply from the original sources is obtained. This latter arrangement may be made by a system of interlocking directorates, so that each firm that passes along the product of another firm is well represented on the board of the firm from which the product is received. A similar result may sometimes be obtained by personal favor, as in a case where people who are members of the same society, church, or lodge will protect each other for sentimental reasons only.

Another case where the supply of material is assured is that of a firm organized to use the scrap made by a larger company. An example is a small shop making counters, the part of a shoe around the heel, out of the scrap leather produced by a large manufacturer of leather specialties. In this case the small concern is organized within the larger one, possibly with the same officials, and is therefore assured of a supply of materials as long as the large firm exists.

Even when a large firm owns its original sources of supply, it is quite common practice to organize subsidiary companies to conduct certain of the preliminary operations. For example, a large rolling mill may own the majority of the stock of

a blast furnace, a railroad, and an iron mine, as well as of other apparently independent companies operating coal mines and coke ovens. In this way all the good effects of complete ownership of the whole plant are secured, with the advantage that in case of stress each plant can go out after outside business. In fact, each plant is usually careful to have some customers in different lines than the next firm in order, so that in time of necessity it can send out a sales force after more business and keep running, even though the company which usually puts the finishing touch on the product may be destitute of orders.

A small shop just starting may lay its plans for expansion, and hope for the time to come when it can snap its fingers at everything except the labor necessary to its success; but at the beginning it may very well conserve its credit by doing the very least possible manufacturing in its own plant, consistent with turning out the distinctive product which its salesmen can present without fear of criticism. An example of such manufacturing is presented in the making of milled screws. The raw material is cold-rolled steel and the product consists of milled screws used to assemble machinery. Cold-rolled steel is made by a multitude of steel mills all over the country, and the screws are used by a much larger multitude of manufacturers. For this reason it is a "safe" business from a banking point of view. Its raw materials are salable in case of stress, and its finished product can always be sold at some price; also, the time between the delivery of the raw material and the delivery of the product is short. In every way the business is a conservative one which will have only a small margin of profit, but which should pay some dividends yearly.

**3. Ownership of a Foundry.**—In connection with the insuring of a supply of raw materials for manufacture, the question frequently arises as to whether it is advisable for a machine shop to have its own foundry. There are many shops that use iron castings as raw material and buy from foundries; there are also many foundries that turn out cast-

ings as a finished product and need these shops as customers. Therefore, it is perfectly natural for one to become the customer of the other. However, in the growth of nearly every machine shop there comes a time when a jealous eye is cast at the profits that are made by the foundry; or friction arises over delivery. Then a foundry is considered, either on the basis of the profit to be made directly, or on the basis of the gain from prompt delivery of castings. In some cases the foundry is built and everything is successful, in other cases the foundry is given up and the loss taken and the old way resumed. The difference may be caused by quite a number of circumstances. It is safe to say, however, that unless both the machine-shop department and the foundry department are independently profitable, the combination is not likely to be kept alive long.

Success in a foundry means the making of suitable castings for less money than is paid or credited for them. Success in the machine shop is rated in similar terms. A company that operates both a foundry and a machine shop has to set a price at which castings shall be credited to the foundry. It may credit them at cost, which leaves the foundry organization with nothing to work for, unless it is to hold their jobs; and that is a most unsatisfactory incentive. If castings are credited to the foundry at the market price, then the only gain resulting to the machine shop from the foundry will be through receiving a better quality of castings. This method is better, for the foundry has the incentive to make a profit at the market and to provide castings of the quality needed for easy machining, strength, or whatever may be required.

4. Where the foundry is credited for castings at the market price, it is very essential to decide in advance what the standard of quality shall be and how it is to be tested. This decision should be reduced to writing and lived up to. No departure from the standard should be allowed unless it is formally agreed upon and reduced to writing. This is equally important with any similar arrangement and is not limited

to foundry operation. The most difficulty will be experienced in defining the quality of the castings required. Once the conditions by which the foundry is to be judged are determined, there will be little trouble, as a superintendent who cannot make good under the specifications will resign without waiting to be asked. If a really capable man cannot be found who will accept the conditions under which the arrangement is made, the only thing to do is to give up the foundry or change the specifications.

The most common cause of failure in foundries is lack of suitable equipment. There are many profitable foundries in existence that do not appear to have any worth-while equipment, but that is not a normal condition. To be sure, there is nothing in a foundry that will compare in effect with machine tools, but it is just as essential that a foundry have whatever is necessary as it is for the machine shop. All the sand that goes in a flask has to be rammed, and if the flask is twice as big as it should be, the mold will cost more than it should. If the only flask that is available is too small, there is danger that the sand will fall from the mold when the pattern is drawn. Pneumatic sifters and rammers have become a necessity, and so on, the foundry having by no means been neglected by inventors and engineers.

The quality of the castings is of great importance in any machine shop. They should be soft enough to machine easily and hard enough to wear well. They cannot be strong or hard enough for certain uses and still be soft enough to satisfy the planer foreman; therefore, they should be subjected to definite tests for whichever qualities are most necessary.

Promptness of delivery, especially of emergency castings for repairs or replacements, is of great importance in some kinds of manufacture. However, it is likely that if the cost of this promptness is determined clearly by the cost-accounting system so that it is included in the price, the conditions will be gladly met by the contracting foundry. Of course, a jobbing foundry cannot play favorites in making deliveries unless it can show that it charges a fair price for the accommodation; but if that is shown there is little danger of criti-

cism. It is a fact, however, that it is often necessary for a company to have a foundry of its own for a time in order to learn for itself just how expensive and difficult these special deliveries are.

5. The same principles that have been touched on in connection with a foundry as an adjunct to a machine shop apply equally well to many other side issues in manufacture. They apply to a mill at which it is decided to have a repair shop, to a shop that ships its product in boxes or barrels and starts a box or cooper shop; they apply to the manufacture of dyes in textile factories or inks in printing shops, and to a great many industries.

Too often, factories for making these things are started to show some one else how independent the management can be. Sometimes the provision of such resources and facilities is justified; for example, in a town where the electric light and power company has a history of variable prices, it may pay very well to maintain a steam power plant ready to start up at a moment's notice; or, when a change is made from coal to oil-burning furnaces, it may be wise to preserve the chance to change back very promptly.

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#### PURCHASING OF MATERIALS

6. **The Purchasing Agent.**—Once it is determined where manufacture will begin, the next step is to make the purchases. In a very small concern this work is naturally placed in the hands of one of the owners, usually the one who makes the most criticism of the others when they attempt it. As the shop grows, this person becomes treasurer, then he hires another man to act as his assistant and take over the buying. This assistant takes the title of purchasing agent, and is immediately studied by firms from whom he might purchase supplies in ordinary times, and his weak and strong points are noted in a thousand card indexes. If he is especially difficult to sell to, he will be used as a try-out by firms who have no hopes of selling him. They send their new salesmen



to see him whenever the salesmen show signs of developing a "swelled head." If the purchaser is rated in the indexes as being easy, the "cub salesmen" will be sent to him, with the expectation that they can get just as large orders as any one else. If, however, he is rated as being a sensible and fair-minded man who does not overlook the fact that he is hired for the purpose of saving money for his firm, he will be honored by the visits of the very best men on the selling staffs. There is no place where the old saying, "Nothing succeeds like success," is any more true than in the office of the purchasing agent. The capable buyer attracts the capable salesman. He does not have to spend nearly as much time over his purchases as he would if the mediocre salesman were sent to him, and he secures a great deal of really expert advice for his firm gratis. A purchasing agent who has a good reason for taking one man's product and not another's will usually be willing to state his reasons in such a way that it is profitable for the salesman to listen. Good salesmen know it and act accordingly.

Every firm has need of materials and supplies, some of which may be classified as staples and others as emergencies, or as major needs and minor needs. Those which are both major needs and staples, of course need the most constant and thorough attention. The emergencies may become major demands; for example, in time of expansion into new buildings the purchase of equipment is a very necessary thing, and one in which the purchasing agent may well take a hand, in spite of any detailed knowledge which the engineering department and the works manager may have. On the other hand, a purchasing agent should not spend too much time on the purchase of supplies of small value, if thereby he must slight the purchase of staples.

**7. Tabulation of Needs.**—It is most necessary that the purchasing agent be able to look ahead. His is more or less of a speculative position no matter what he may wish. If he buys hand to mouth at the market, he may pay a high price for his conservatism or he may save much money, as the

case may be, but if he knows how much of a given product he will be sure to need in a year's time, he may be able to secure very decided concessions. Consequently, it is a growing custom among purchasing agents to set a maximum and a minimum for each of the staples that must be purchased. The maximum is the largest amount which the purchasing agent can carry in stock without special approval of the management, the minimum is the amount at which he must take steps to have a new supply coming in. For example, a concern using 12,000 tons of coal per year may decide to carry not over four months' supply and not less than one month's. Then, whenever the amount in the bins, as shown by the stock or stores department, is reduced to 1,000 tons, the purchasing agent must buy, whatever the market; but up to that time, whenever the amount is less than 4,000 tons, he will be on the lookout for bargains, which he will take over whenever he feels that quality and price make it advisable to do so.

This system is applicable even more to smaller supplies. For example, the supply of ink required in the office may have just as definite a range as the coal supply, in fact the purchasing of it may be made entirely automatic, so that the orders may be given by a clerk in the purchaser's office and not have to come to the purchasing agent's attention at all. The same is true of the large number of supplies which may be rated as staples and minor supplies. To care for these, all that is required is that a report be made from the stores department whenever the stock of each article reaches the lower limit. These limits should be set, however, by the purchasing department, as it is necessary to change them from time to time according to deliveries. For example, suppose that a cutlery factory uses grindstones. If transportation is normal it may be possible to make a purchase and get the stones in the store room in two weeks. If the demand for grindstones is great or if transportation is congested, it may be necessary to start the purchasing machinery in motion four weeks ahead of delivery. In that case, instructions might be given to the stores department to report reduction of stock on hand to

the purchasing department much sooner, or before the actual number of stones on hand reached the point at which the purchase must be made.

**8. Sources of Information.**—Many persons think that the duties of the purchasing department are only those of selecting from the goods offered by salesmen. Such buying is of course important, but the man who depends entirely on goods being brought to him must have very great confidence that his firm is well known and that he is in very good favor. For example, a number of years ago there was a firm so unfavorably known all over the eastern part of the country that no salesman went to them with any idea of quoting bottom prices on goods. They were always finding fault and demanding concessions, and yet they were a prosperous and well-financed concern. If they depended only on the price brought them by experienced men on the road, their loss must have been very great. The best purchasers do secure the cooperation of the salesmen, but they also travel freely themselves and make the acquaintance of the people who manufacture the things which they need. Certain supplies are highly technical. The purchaser of inks for a printery, or the purchaser of grinding wheels, has to depend on the reports which are given him by the foremen and workmen in his plant, unless he enlists the services of outside experts. In the case of grinding wheels, for example, he can have an expert come from the factory and demonstrate the possibilities that his wheels have. In this way he is sure that he is not being hoodwinked by some foreman who is receiving favors from some agent for another make of wheel. This only illustrates one of the many ways in which the buyer, in order to protect himself in cases where he cannot be expected to be an expert, enlists the services of others.

**9. Testing Materials.**—It may be wise in many cases to prepare specifications that require the material to come up to definite tests. Then a testing laboratory may be necessary or else confidential relations must be entered into with some commercial laboratory. It is not always enough to

depend on the expert services of a manufacturer or wholesale house. An example of this is shown by the experience of a machine shop when the management wished to make sure that they were purchasing the proper lubricating oils. Everything appeared to be all right with the oil they were using, but another firm had offered oil which they guaranteed to be better and at a lower price. In order to settle the matter, the purchasing agent called for samples from several oil concerns, including the one that offered the new oil and also the one from which he was then buying. The latter told him to take their sample from the stock that he was using, but also offered a new oil at a slightly advanced price, which they said would be found to be worth much more than the extra cost. The oils were all submitted to friction tests at different temperatures, from which it was possible to discover which oil produced the lowest coefficient of friction at the ordinary running heat of around 100 to 110 degrees. It turned out that the worst oil was the new one that was offered by the firm that was regularly supplying the oil. It was not at all suitable at the normal running temperature, but only got into action at upwards of 140 degrees, which was too high for safe working on ordinary shop lubrication. The newly offered oil from outside was but little better, though it began showing a low coefficient at around 130 degrees, while the original oil that was in regular use showed so much better results at the ordinary temperature that it was discovered that the shop could not afford to accept as a gift the new oil offered by the competitor, much less the new oil offered by the firm that already had the contract. Inquiry developed the fact that in making up this latter oil they had added a small amount of very heavy cylinder oil, which was not intended as a lubricant except under steam pressure at upwards of 212 degrees. In this instance the purchaser did a real good to all the parties to the test, as he showed them the results of trials under conditions which approximated those of regular use much more closely than did the viscosity tests and chemical analysis to which they were accustomed.

**10.** It is becoming more and more customary to buy supplies on specifications and to conduct tests to see that the goods are up to specification. The old guarantees of "best quality goods of good workmanship" have served their purposes and have been relegated to the place where they belong among the uncertainties of the past. No one would think of ordering steel today without specifying the number of points of carbon which it shall have, or, if it is an alloy steel, what the percentage of the various alloys of nickel, vanadium, or whatever is desired, shall be. A great many of the ordinary supplies have not, however, yet been reduced to such a scientific basis that they can be ordered safely purely on specification. For example, leather belting is still very dependent on the selection of the leather by experts who are not able to reduce their own method of selection to rules which can be followed by others. The cutters likewise do their work by virtue of long experience and a knowledge of leather that is almost uncanny. Lumber likewise is graded, but the grading is done by very human men. It is done very rapidly and many times the lumber will go in a different grade at the end of a hard day's work than it would in the morning. In the buying of such materials the purchasing agent can only be guided by the best experience that he can find. He will usually pay quite a little more for his supplies of such nature than he would if he were buying on price alone, but the difference he will charge up to insurance against disappointment when the goods are put into use. A house that does make good selections of material and that will not allow itself to be drawn into price competition, and that can be entirely depended on, is the house from which to buy materials that are difficult to specify, while on goods that can be surely tested and the manufacturers of which know the test to which they will be submitted, it is safe to send out specifications and allow whoever will to bid, care being taken to be sure that the bidder to whom the contract is awarded is able to fill the order.

**11. Payment for Supplies.**—Every firm has the problem of cash discounts and the problem of inspection, and these



are likely to overlap. Goods are billed on the date of shipment, and cash discounts are offered, usually for cash in 10 days from date of the bill. At the time the payment must be made to secure the discount, the goods are still in transit, and there is no check on the quantity or the quality. Dependence then must be placed on the firm from whom the goods are bought to make sure that they are as billed. It is quite the custom to take the discount whenever offered and leave the matter of a final settlement to be taken up after due inspection of the goods. This is not altogether satisfactory to anybody. Once a firm has the money for a shipment of merchandise, it is very hard for them to give it up and make a rebate. They will consequently make a much firmer stand against criticism of the goods than they would if the money had not been received. Cash discounts, however, are very much worth while, as they represent higher interest rates on money than are ever asked by the banks except in times of great money shortage.

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## ORGANIZATION

**12. Form of Organization.**—After a supply of labor and materials is made available, and the buildings and equipment are ready, it becomes necessary to organize the production department so that it will run smoothly and do progressive work. In the past, organization has been largely a matter of evolution. One man or two or three partners have begun without any visible organization. Their business has grown, and while each still kept an eye on everything done they each assumed a certain amount of responsibility. Then as they employed minor executives, and, with still further growth, higher executives, they have found themselves obliged to make definite divisions of their own work, lest they put these employes in the position of trying to work for more than one master. There is nothing much more trying than to attempt to work for one of these concerns at a time when the founders are trying to make up their minds whether they are an organization or merely friends doing business together.

**13. Line Organization.**—When the shop is started by one man, the problem is usually simpler than that just described, though the solution is not necessarily much more satisfactory. One-man control makes for action and prompt action at that, there is never any question whether a decision may be obtained on any point and at once; for the type of man that does not make decisions is not likely to have a growing business. The founder will most surely have what is known as a *line* organization. He will be the head; under him, each in charge of specific things, will be two or three subordinates, probably the superintendent of the shop, the head of the sales, and the bookkeeper, or head of the accounting force. These men will pattern their conduct after that

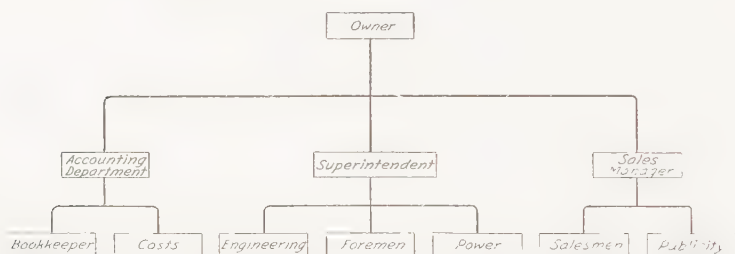


FIG. 1

of the owner, each will be a king in his own department, and each will feel free to order the others out of his own particular province if the mood strikes him. They will hold their jobs by virtue of fitting the personality of the owner, and he will be unwilling to discharge them, no matter how independent they become, because they have grown up with him and they fit him as an old shoe fits the foot. This same form of organization is passed along down the line, from which the form takes its name.

Fig. 1 indicates the course of authority in a line organization. One advantage of this organization is that it makes one-man control possible over a large business. A notable example of line organization is the army, where each private is under a corporal, the corporals are watched over by the sergeants, and so on. In this form of organization no man

can step out of his place without being noted, and mutiny is almost impossible. On the other hand, it is true that the very organization that makes it so easy to maintain discipline also prevents men from becoming of any value except that assigned them by some one higher up. It practically makes it necessary for each person to wait for some one to die in order to obtain promotion.

In a business concern, the line organization is especially apt to bring about internal politics or government by favor. The man at the top, by very virtue of his position, can see but a little way down the line. He knows his immediate subordinates thoroughly, but he is only aware of the existence of the next tier of people, and the workmen themselves are so far removed that his only impression of them is that which remains in his memory since the time when he was a workman himself. If that memory makes him desirous of giving his workmen a fair chance, he has no opportunity to insure that they get it, because his orders go through so many hands that they may be distorted before they reach their destination. As a general rule, each man in such an organization will take the position that he is to be judged by results only, and that the details of how he gets the results are not of any importance to the people higher up. This form of organization is by all odds the hardest in which to do improvement work, whether it be better employe relations, methods of manufacture, handling methods, or what not; because intense jealousies are everywhere present, and every foreman is afraid that he will in some way lose prestige if he allows any one but himself to even know how he conducts his department.

**14. Line and Staff Organization.**—In the process of evolution, the line organization is likely to find it necessary to introduce experts as advisers to the owners of the business. It may be that these will first be called in for some emergency. As a rule, this practice is not begun except in extreme necessity. It may be that competition is keen and that the firm does not see any way to meet it, so, rather than give up with-

out a struggle, some outside consultant is brought in. If he is successful, he may be asked to make a permanent connection with the company, for fear that he may pass along his acquired knowledge of the business to some other competitor. Once the line is broken by this expert, there is likelihood that more will follow. It seems in some way to be easier for general managers to hire men outright to work under their directions than to go to a consultant and admit that they cannot accomplish what they would like without outside aid. To hire such expert outright is entirely legitimate, until the time comes when the company, having taken from him all that it thinks he can give, casts him aside, thus destroying for him his past efforts at building up a business of his own.

15. The staff may include the engineering department bodily, it may include experts in accounting and in safety engineering; in fact the whole employe-relations group, except the section which actually hires men, may come under the head of staff. Then there is a possibility of a laboratory for the testing of materials bought or the product of the firm, or for experimental work. All of these departments generally report directly to the general manager, except, as will be explained later, in cases where the committee system of control is in force. There are also exceptions in the case of the engineering department, which in many cases is a part of the line organization and is under the works manager. It is an open question whether the design of the company's product should be exclusively in the hands of the production department. It seems that the sales department is in a position to know what the market demands and to know what talking points should be incorporated in the product to make the sales easier. If the engineering department is concerned only with the design of buildings and in providing equipment, there can be little question that it should be directly responsible to the general manager, so that it can have the advice of both the sales and the production departments, but will not be controlled by them.

A laboratory is very likely to be a part of the production

department, except as it is engaged in experimental work looking to additional products or to improvements on the old. If the laboratory is for testing the product of the concern, it surely should not be under the production department, but should come at least one stage nearer to the general manager; since, if it is under the production department, it is practically inspecting its own work, and will be subject to all the temptations and influences of the production department.

**16.** The department dealing with employment and its related work should most surely be under the highest official of the company who is able to give it attention. The office that does the actual hiring of shop employes may well be under the shop superintendent, as it is an executive office and very directly connected with production. But the interviews with the men leaving the shop should not be in any way influenced by the shop organization, nor should the safety work, the medical work, the feeding, the follow-up, or any of the other functions of the personnel departments. These departments must necessarily at times find much to criticise in the production department; but they are seldom placed in a position to do more than make recommendations. Those recommendations, however, will be such as to require executive action on the part of some one else to put them in force; therefore, the departments should be in a position to present their advice to the head of the whole organization and should most assuredly be in a place where they can do their work without interference by the production department.

**17. Organization Charts.**—There are three varieties of organization charts. The most common form, the strictly *organization* chart, shows the line of authority. The *function* chart shows the functions or duties of the various officials or departments. Another chart is the *flow sheet*, which shows the flow or movement of orders, materials, or ideas in the carrying on of the work.

The first value which these charts have is that they bring before the management in a bird's-eye view just what the "kinks" are that prevent free flow of orders, material, and



ideas. Many a firm when confronted with charts showing just what is going on in its plant has cut down the amount of red tape and expedited production thereby. It is often found that many things have to be approved by man after man who has no interest in them, but who does it merely to maintain personal prestige, and by men who sign everything as a matter of course, not even reading what is put before them

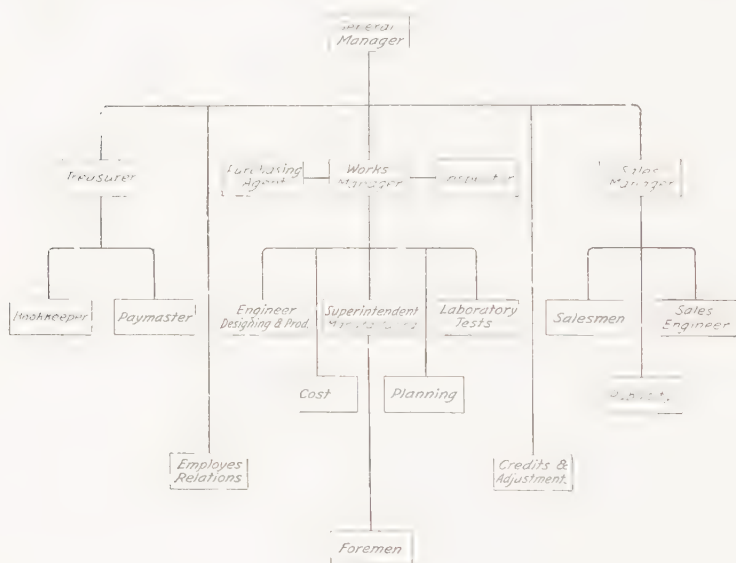


FIG. 2

The one great danger in using these charts is that they will be used and referred to only in defense of some procedure, and that they will be overlooked or overruled in the ordinary course of business. It is not at all unusual to find charts that look well, but which have been so fully superseded that they have ceased to be anything except ornaments on the walls. If kept up to date and respected by every one, including those who are responsible for them, charts are a great help. To a subordinate, they are most necessary, as otherwise he does not know to whom he is responsible for certain things and from whom he should accept orders. Of course a subordinate

cannot refuse to do anything required of him by the president of the company, but if he can say, "Will you look out that my superior knows about this and arrange so that he will feel all right about it," then he reminds the president that the latter is stepping out of his own organization to go past a subordinate. Moreover, an organization chart should be available to every one. It should not be a secret, but should be

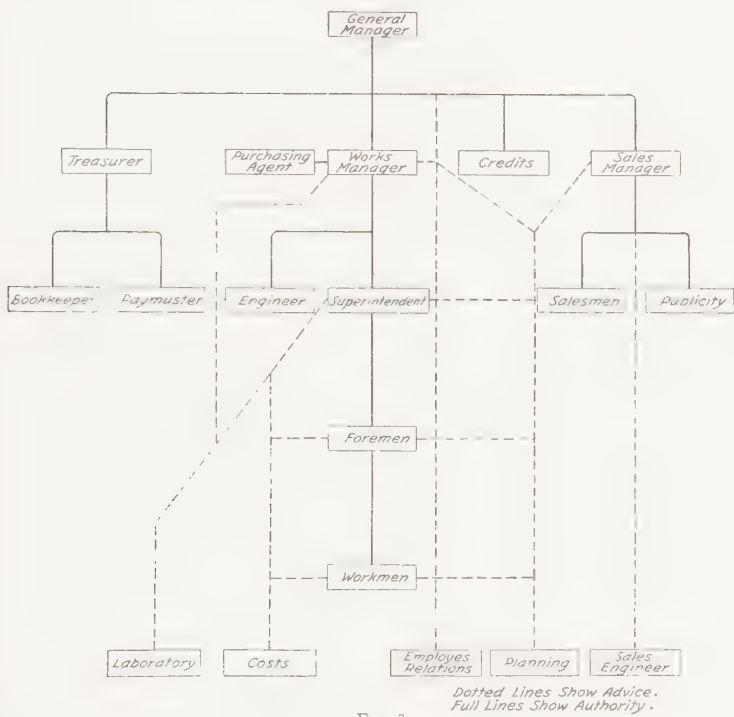


FIG. 3

a usable and much-used tool at all times. The time-honored saying that "no man can serve two masters" is forgotten many times a day in some otherwise excellent shops.

18. The functional chart is of the greatest value, though not so often found. Lines of authority are very necessary, but modern business is going less and less by authority and is falling back on common-sense cooperation, and is trying to

secure organizations that will function well because men know what part they are supposed to play and where their responsibility begins and where it ends. Whenever a firm that has been in operation for many years draws a truthful chart of the functions performed by its people, there is usually great surprise at the way evolution has twined and twisted things together. Many parallel functions are found exercised by different men, and the same man is found exercising functions of such different nature that a mental gymnast would be required to go from one to another. Most charts exhibit a combination of the line of authority and of function in their make-up, as shown in Fig. 2. A better form for such a chart is shown in Fig. 3, in which authority is shown by full lines and advisory relations by the dotted lines.

**19.** Flow sheets are a great help, especially to new executives, who are likely to make mistakes that slow down production through ignorance of accepted procedure. A flow sheet illustrating the steps necessary in changing an employe from one department of a shop to another is shown in Fig. 4.

Flow sheets are applicable to the movement of material from the time it enters the shop until it is assembled and shipped out; they are also applicable for small steps in the process, for the flow of ideas from the shop back to the office, for procedure in getting out circulars descriptive of the work and product, for the making, acceptance, and execution of new designs, and for every purpose where more than two men have to cooperate in accomplishing anything. There is no need of making flow sheets for every instance; but the moment any question arises regarding a division of responsibility, or an executive finds himself unable to decide to whom he should send anything for the next step, a flow sheet should be made and adhered to.

**20. Division of Functions.**—There are only a limited number of minds that are capable of handling accounting that are also mechanical; even fewer that are mechanical also have executive ability, though there are more that combine executive ability with accounting. Then there is the type

of mind that sees things from the sales point, that is, from a detached position, as through the customer's eye rather than its own, and that ability is seldom found combined with any of the other types of executive. In general, the functional organization of an industry should be such as to allow the individuals who are available to take upon themselves the

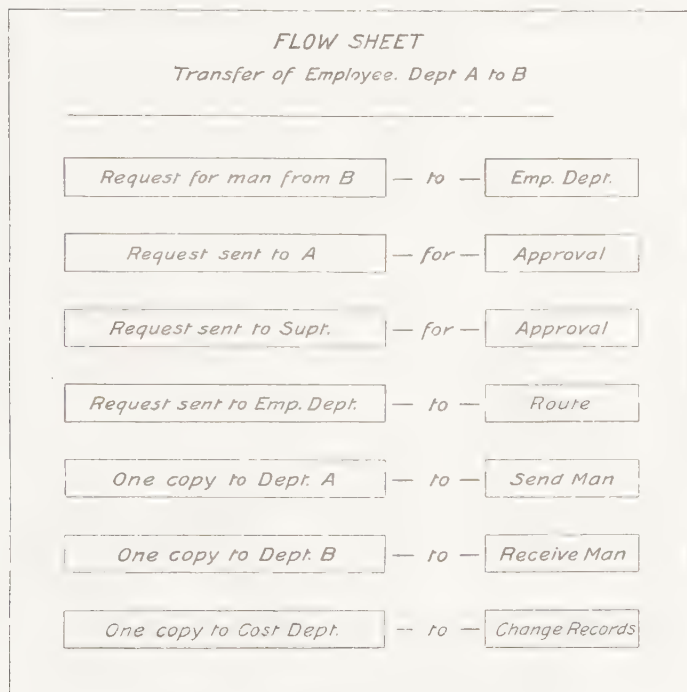


FIG. 4

duties which are most congenial and in which they have the greatest ability; however, it is seldom that a large organization does not find itself obliged to place some man in a position for which he is not adapted by nature or temperament. For example, a firm may find that it has two men equally capable as traffic managers and none that is above par as head of the stores department. It may be necessary to place one of the two traffic managers in the stores department, even though

that may not be the best place for him, and to pay him a salary commensurate with his ability, even though a good store keeper might be found for less money. The safety in having a man who can step into the traffic department is worth the extra cost of keeping the other man in stores. These conditions are found in nearly every large plant in some place or another.

Functions naturally divide into the large groups, such as production, sales, accounting, and so on. Sometimes a good salesman and a good production man are found in the same person, and sometimes a good accountant may make a good salesman, but very seldom does a good accountant have any desire or ability to get into the shop. Shop men are constantly wanting to get on the road, and in highly technical industries they are likely to make good. This distribution of ability makes it quite desirable that the time-keeping department, the clerical people in the stores and the stock departments, and similar employes in the planning and cost departments should be under the direction of an accountant. This is not a usual division, as these departments are quite likely to be under the works manager, if not under the superintendent himself. It so seldom happens that a man who is suited by training or temperament to the superintendency of a plant is at home in even these simple forms of accounting, that the real control of such work is usually found in the accounting department, even though the men who do the work are nominally under the control of the shop man.

**21.** It is a very common thing to find a superintendent who maintains that, in order to keep up discipline and maintain his authority, it is necessary that everything inside the shop limits shall be under his absolute control. He considers himself responsible for production, and reasons that he cannot be held responsible for that which he cannot control. There is enough truth in his reasoning so that it is worthy of consideration. If the organization does hold him personally responsible and washes its hands of all its responsibility, then he may be right; but he has assumed a place



that any man should consider deeply before he takes it; for if he is literally without the support of the rest of the organization, he is likely to lose his job whenever business conditions which he cannot control, and only the sales department can influence, make business in general poor. If, on the other hand, he expects the hearty cooperation of the other departments in both good and poor business conditions, then he ought to concede the necessity of their having a constant knowledge and check on what his department is doing.

Whether the stock department, the planning, and the shop-order departments shall be under the superintendent, the works manager, or the general manager, is governed by the way the firm is organized as to this cooperation or lack of it. Planning, as will be explained later, is something that is technical, so far as executive work is concerned; engineering, so far as the future is concerned; and accounting, as to its records. For this reason it would seem wise to place planning under the executive who controls all three of these departments, who in some cases is the works manager, more frequently the general manager, but seldom the superintendent.

**22.** The finished-stock department likewise comprises distinct functions within itself. It may easily be technical in such shops as make products used in engineering. Thus, in the manufacture of grinding wheels the stock room becomes of great importance, owing to the great variety and range of wheels required; and the stock keepers have to know which wheels will be considered interchangeable in different parts of the country and for different machines. For example, an order for wheels for saw gumming from Alabama requires quite a different wheel from an exactly similar order from Oregon, owing to differences in lumber sawed and also to customs. However, any well-organized stock room maintains a perpetual inventory, which is really an accounting function. Moreover, the sales department has a vital interest in seeing that stocks are maintained of salable goods that may become emergency goods under certain conditions. A manufacturer of farm implements knows that weather con-

ditions, which he cannot predict, may make a considerable difference in the number of sprinklers required for spraying Paris green on potatoes, and that the rush demand, if it comes at all, will be at a certain definite season, and that if the shop gets two or three weeks behind its schedule it may make a great difference in the profits from the sale of such apparatus.

The order department may appear to be distinctly a sales department affair, but the shop may have a very large interest in the way orders are divided up into shop orders. A rubber-shoe factory may have lasts for so many thousand shoes of certain sizes, and will want its orders to come in multiples of that unit rather than exactly as the order comes from a customer. But, the sales department knows the conditions, so that it can best say in what sequence the different parts of the order shall be delivered, and knows whether in order to retain customers it may be advisable to make the shop cost slightly larger by splitting an order and letting a smaller order come through between the parts of the larger one.

**23. Cooperation.**—From the foregoing it will be seen that it is virtually impossible for any department to take its stand entirely independent of the rest, but that full cooperation is necessary to secure the greatest profit possible. Habit has in many industries made the manufacturing department very much averse to so-called interference, but this attitude has often been changed by resort to the committee system, as explained later, which softens the blow that the production department feels has been dealt it when any of its privileges are taken away. This method appears to be a very good one, because in a committee conference in which the superintendent meets the sales manager and the accountant face to face with the general manager, the superintendent realizes that he is outnumbered and that he must present not statements alone, but arguments. The question of discipline under divided responsibility is a grave one, but not so vital as many superintendents think. As a matter of fact there is no such thing as discipline possible in a shop, in the sense

in which the word is commonly understood. No punishment of an employe for violation of rules is possible. Once hired, he must be paid according to the agreement so long as he is retained on the pay roll. Of course, the law is infringed at times, but for the most part employes are fully aware of their rights and insist on them. During good times, it is not usually a loss to a man to be dismissed from a job. During dull times, no one takes the chance of being dismissed for reasons of discipline, unless he wishes to sever his connection with the company more than he wants the job. He may try breaking rules to see if the company really means them, but he only does it because he does not care much for the job itself under the rules which govern it.

**24. Committees to Aid Cooperation.**—Corporations that are an outgrowth of a family concern are very likely to make considerable use of the committee system. In such a case, instead of some one man's assuming authority and making a decision, that might hurt the feelings of some one else whose good opinion is of more importance than dividends, the matter is taken up by a committee in which all interested in the matter are represented. For example, it may be that the heads of such a company are not agreed as to the best way to handle transportation of employes. Instead of allotting the matter to one man, a committee is formed in which all who have differing ideas are represented and that committee calls in every one whom it feels might have suggestions of value, a vote is taken and everybody feels good natured about it. However, the process is so slow that, while the committee is coming to a decision, one man with the requisite authority might have the whole plan in operation and be at something else.

There can be no doubt that the plan of doing business by committee conferences is slow, but it is in line with the advancing wave of democracy in business, and probably will increase rather than retrograde. The present tendency is toward committees to decide on policies that are to be put in execution by individuals, in which case the committee becomes a

functionalized part of the staff, advising the general manager what to do before he issues orders for the line officials to carry through. These committees may be formed at will for the solution of any perplexing matter or any matter in which there is not unanimity among those in control.

**25. Shop Committees.**—In some industries, shop committees are finding a place in the business organization. These have usually been started to offset union activities, but in many places they have functions quite different from those relating purely to wages and hours of labor.

The theory of the shop committee is precisely that of the committee of the management, a plan to assist in smoothing out things where personal jealousies might make a rupture. The shop committee can hardly have executive functions and thrive. It must from its very nature be advisory, but its advice is so publicly known that it can hardly be turned down unless there is a desire to precipitate a quarrel.

The course of shop committees however seems to be rather uncertain. When they are first formed, there is considerable enthusiasm. After a little time they may turn in several directions; they may resolve themselves into grievance committees and, after they have achieved all that is reasonable, may begin to be captious and stick at very small points. The management gets impatient at their narrow point of view and abolishes them entirely. Or they may become political, and men may resort to the same methods used in ward politics to secure nomination and membership in the committee, and then they may secure advantages by impressing their constituents with the value of what they have done. In any case, the members of the shop committee are not in an enviable position, as they have to compromise among themselves and with the management in order to accomplish any good at all, and then they have to explain to the workmen how it happens that they have not accomplished what was desired.

Some committees have been formed with the express restriction that they shall not discuss wages and hours, but shall act for the purpose of promoting athletics or entertainments or

aiding the sick or for some purpose not always uppermost in the minds of the employes. However, to form a committee with such restrictions is unwise, because no power whatever can prevent them from considering these things, and if no attention is paid to their requests, the management is deemed antagonistic to them and to the employes. The one thing that cannot be barred is discussion of wages. To try to prevent it is comparable to gathering the sales department for a conference and trying not to mention prices.

**26.** The method of selection of representatives on committees varies in different concerns. In some, the workmen all assemble without any of the management present and vote for their representatives in open meeting, very much like a town meeting; in others they vote by the Australian ballot and each man's vote is a complete secret unless he sees fit to announce it. In some cases the whole shop will vote for delegates at large, and in others each room or department will vote for an allotted number of representatives. In some cases the representatives who form the council that deals with the management are elected directly by the workmen, in others the body which is elected by the workmen elects still another body; and in some cases this last-mentioned body elects a very small executive committee which handles nearly all matters without referring them back to the larger committee. In one shop, the final executive committee meets by itself and sends resolutions to the management, in another the executive committee is met by an equal number of persons selected by the management and a joint meeting is held, the votes of which are considered by the management then and there. Every possible combination of these elements is in process of being tried out somewhere. The whole system of shop committees is in process of development, and only experience can show what methods of dealing with them are best.

From the employe's point of view the secret ballot in connection with the election and operation of shop committees is undoubtedly very necessary. Some men resent having even so much restriction put on them, and declare that any one

who is not man enough to vote where every one can see what he is doing should not vote at all. Nevertheless, the secret ballot undoubtedly cuts down the amount of time spent in electioneering about the shop, with the attendant loss of production for some days or weeks prior to the election.

**27.** The committee offers very distinct advantages from the employer's point of view in furnishing a small body of people with whom to deal. It is, however, difficult to get suitable representation of different parts of the shop with a small committee. For example, in a small shop there may be a large number of woodworkers and a small number of yard men, machinists in the repair shop, blacksmiths, rubber workers, coopers, and so on. The work of all these men is necessary, their trades are quite different from the woodworkers, and it is practically impossible to get a truly representative committee unless there are enough members so that the trade having the smallest number of employes has one representative and each other trade has representatives in proportion to its numbers. An expedient that has been used is to elect this large committee and then for that committee to elect, from its own number in some cases and in others without restriction, a smaller committee which is intended to represent the whole shop. This plan has the difficulty that the smaller committee may very likely have on it no representatives of the trades that have but few employes.

It is not at all easy for a woodworker to understand the troubles of a blacksmith nor to see why he needs suitable equipment nor to understand what is suitable. This same lack of understanding is likely to be found wherever the shop contains a minority of highly skilled workmen whose work is, however, essential to the continuation of the work of the majority. The shop committee in such a case transfers the need of an understanding from the employer to the shop committee. Experience so far indicates less tolerance on the part of one body of workmen for another than that existing on the part of employers toward these same men. The best



that can be done seems to be to insist that at least one representative of one of the minority trades be on every committee that sits with the management. Of course insistence by the management on the make-up of committees does not make for a pure democracy, but that perhaps is not of great importance.

28. In the deliberations of the large committee elected by the workmen themselves, it does not appear that the management is even represented, in many cases, though they are expected to provide the room, the time, and the equipment. This is undoubtedly a wise provision; for if nominations are made from the floor there will undoubtedly be many speeches made that would be enlightening to the management, but which would not make for further good relations. The executive committee, when there is one, is very likely to have its principal deliberations in private and to appear in meetings with the management only after the committee have united on a policy, which is as it should be for the good of both parties.

The test of time alone will tell to just what extent the whole number of employes care about this representation by committee. In the meantime it appears wise, though it is not often mentioned, to insist that a majority constitute a quorum and that no vote by a smaller number shall be considered carried. It is customary, also, to make a certain length of service a qualification both for voting and for holding office. The length of time in the company's employ to entitle an employe to vote is placed all the way from one month to a year, while the employes who hold office must have been in the company's employ from 6 months to 2 years. It seems reasonable to let employes vote for their representatives as soon as it seems likely that they intend to remain, and that the officers should be chosen from among men who have been with the company long enough so that they are well acquainted with its methods, which is seldom less than a year. It has been suggested, but not so far put into effect, that every new employe should pass over one election after he is hired before

he is allowed to vote. This is suggested as a means to prevent important offices from being filled with the friends of some group of men who do not intend to stay and who may possibly not even have severed their connections with the firm for which they worked before.

Perhaps the things most to be feared in connection with the committees are a total loss of interest on the part of the employes who might be of the greatest assistance to the firm, and the danger that men will be elected as representatives on account of their social qualities rather than because of their ability to represent truly the men who elect them. If the employes elect men for such reasons, they will only be following the precedent established in the past century of this republic, where there has been a strong tendency to elect representatives and senators because of qualities that have little relation to their administrative abilities.

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## DESIGN OF PRODUCT

**29. Who Should Control the Design?**—If the company is a one-man concern there is no doubt as to the man who shall control the designs; it is the one man, of course. If, however, the company is made up of men who are practically in partnership, there is danger of friction over the designing. If the company is virtually in the hands of its general manager with an absent board of directors who are only interested in dividends, another set of influences may determine the work of the designing department.

The question of who should control designs depends, likewise, a great deal on the nature of the product. If it is wall-paper or automobile bodies, it may be that the sales department may properly have the greatest say, because sales depend on suiting the taste of that part of the public that is being catered to; but if the product is automobile engines, electric motors, or machine tools, the engineering department should have the say, subject to consideration of the manufacturing difficulties which the shop may discover on inspection of the drawings. In all these cases, it is vital to remem-

ber that the product must be sold as well as manufactured, and that sales may sometimes be more easily made by making production costs higher. If "talking points" will save the company more than they cost, then they are certainly worth while. For example, in almost every new product there is an evolution from incompleteness to completeness. The automobile and the phonograph began with comparatively simple things that were very incomplete from our point of view today. The automobile of 20 years ago needed head and tail lights, horn, wind shield, and other devices. The phonograph has grown in completeness in the same way. These all cost more to produce than they might without certain refinements, but the customer gladly pays the bill, for he now knows that when he has bought any of these things he has something complete, and that he will not have repeatedly to go down in his pocket for necessary extras.

Questions in regard to such things are properly determined by the sales department; for that department is in touch with the customer and knows whether the public will pay enough more for all these extras to make it profitable to furnish them, or whether such things will enable the sales force to make sales for enough less cost so that they will be profitable, or, in other cases, whether the fact that some competitor offers a complete machine ready for use has made it necessary to make a similar offer with little regard to whether it is more profitable or not.

**30. Design as Related to Production.**—From a purely production point of view, differences in design may make very considerable differences in cost. As a general rule, the designing department is likely to look out for things that do not so much appeal to either the sales or the production department as to engineering. Perfection of mechanical operation of machinery is a natural thing for an engineer to place above cost or selling points. In some important manufactures it is the most important. If the product is scientific instruments, then mechanical perfection is everything. If it is wheelbarrows, then it is best to let well enough alone, for added mechanical perfection will not be appreciated nor paid for

Certain things however are strictly in the province of the drafting room or engineering department, for, within the limitations specified by the sales department and the production department, they still have the problem of designing parts so that they can be readily made and equally readily assembled and disassembled. The ease of production of parts is likely to receive much the greater attention, more than it really deserves; for money spent on the erecting floor adds to the cost just as does money spent in preliminary operations.

**31. Design of Parts.**—A concern that makes nothing but steel wire nails has no problem of design, because it cannot depart from established standards of the trade. A concern that is building machine tools is under the necessity of making its machinery sufficiently distinctive so that it will not be scornfully referred to as a copy of some other manufacturer's machine. Manufacturers of automobiles must make their cars sufficiently different from all others so that they may be instantly recognized from some distance, for advertising purposes. Yet in all these cases there are considerations of design that can make the difference between a profit and a loss. In the case of wire nails, the very slightest difference in the shape of the head may have a considerable influence on the length of time the dies will wear or on the ease with which they let go after the head is upset. In the machine tool, there are numerous parts that perform important functions, but which are never seen by the purchaser unless in case of a breakdown. In the automobile, the same holds true. So far as these things are concerned, then, the engineering department should, after providing for strength and mechanical perfection of the degree needed for successful use, consult the shop as to the form and material of details that will make manufacture economical.

For example, consider the use of standard parts. If, in the case of an automobile, it is possible to buy all nuts, bolts, screws, and washers from standard stock, there is not only a saving for the manufacturer, but there is a great convenience

to the purchaser. The idea that it should be made necessary for a purchaser to send to the factory for trivial repair parts has been shown to be erroneous. A cabinetmaker who specifies sizes of glass a trifle larger than standard sizes makes his firm pay for the next larger size with no salvage. Tubing can be obtained in so many sizes and thicknesses of wall, that it should not be necessary to create new sizes; and yet special sizes are being called for all the time.

**32.** Within the shop itself, standardization is not only possible but profitable. If, for example, the company manufactures a line of woodworking machinery, it is possible to use the same parts on different sizes of machines. The parts may be unnecessarily heavy and strong for the smaller machine, but the labor cost is so much reduced by making lots twice as large that the difference in cost of material is much more than made up. A manufacturer of engine lathes can use aprons of the same size on both an 18-inch and a 20-inch lathe, and the same on a 14-inch and a 16-inch, and make a profit by so doing. There is especial advantage in using as many gears of the same size as possible, for a very considerable gain comes from so doing. Also, parts of the same kind that can be made to advantage on a screw machine or a turret lathe should be used on as many machines as conditions permit, for the reason that the cost of screw-machine products decreases rapidly as the lots are made larger and the cost of setting up the machine is distributed over a larger number of similar parts.

**33.** Selection of materials is also of great importance. In making machinery it is often the case that ordinary soft steel is amply strong and otherwise fit for the purpose, but that it will pay to buy a higher grade of steel for the sake of the greater ease of machining. For example, if the part has screw threads, it is wise to use steel of at least 25 to 30 points carbon (that is, .25 to .30 of 1 per cent.); as the tools last longer, and they do not require to be kept to as keen an edge as is necessary in order not to tear the material and spoil the job if low-grade steel is used. If the work is straight, like

rollers or shafts, and it is to be ground for the final finish, there is no great difficulty in using the low-grade steel; but if the work has any outlines that must be formed to a curve or if screw threads or channels are to be made, it is profitable to use the harder stock, as it can be finished well with ordinary cutting tools. Such instances multiply and make necessary the careful study of materials in the engineering department, a thing that often is not done. It is even true that parts ordinarily made from castings can often be more cheaply made on the screw machine from cold-rolled stock. Castings themselves can be annealed, and thus a great deal of the cost of machining will be saved as well as cost of tools used and worn out. Also the internal stresses in the castings will be eliminated. The practice of annealing is, however, confined almost entirely to shops like those of manufacturers of textile machinery which have great numbers of small parts that can be annealed at once. However, an annealing furnace is not expensive and in these days of gas requires little attention.

**34. Design for Easy Machining.**—Particularly in the manufacture of machinery, there is great possibility of saving money by adapting the parts to easy machining. There should be a constant balancing of the advantage of making parts in one piece and of making them separately and fastening them together. If parts are made in one piece, alignments that are necessary are guaranteed except for wear. However, it may be very much cheaper to make them in separate parts and bolt them together. If, when bolted up and sufficiently dowelled, they cannot be disturbed so far as alinement is concerned, then it is surely wise to make them that way, unless the appearance of the product is against it. Some designers seem to have a mania for making their machines, as they say, "in the foundry," casting as much in one piece as possible. This is not only expensive in the foundry, but it often may make the total cost very high, indeed. For example, suppose that a part is to be made which comprises brackets carrying a slender shaft and that there are



three or more brackets, as in Fig. 5. In order to secure correct alinement of these bearings it is necessary either to babbitt the shaft in place or else to bore the holes with a long slender boring bar with which only a very light chip can be taken

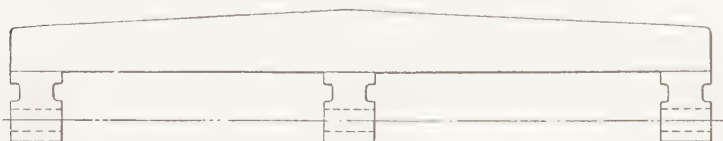


FIG. 5

at a very fine feed. Even then, the final reaming of the hole is likely either to throw it slightly out of line or else to produce fine chatter marks.

Another common source of high costs is due to designs that are awkward to machine. For example, Fig. 6 shows the cross-section of a slide with a projecting arm in such a position that it is almost hopeless to attempt to machine it at all. It can be done by using two cutting tools, one of which will reach part way down the right-hand bevel and the other the rest of the way, and doing the job on a planer. The piece can, however, be reduced to a milling-machine job by making it in two parts.

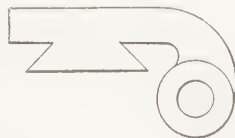


FIG. 6

**35. Design for Long Life.**—Certain manufactured products are articles of consumption and are not efficient unless used up, as, for example, grinding wheels, milling cutters, and similar articles. Long life in such a case means simply life as related to effective working. It is always wise to buy grinding wheels that will cut freely, rather than those that merely glaze over and yet last a long time. With milling cutters, long life means retention of a fine cutting edge for a considerable time. On the other hand, steam engines are ordinarily used for many years. They require expensive foundations, and the installation expenses are heavy. Consequently, they are designed to last for as long a time as possible. The cylinders are made heavy enough so that they

can be rebored several times without becoming weak. The various bearings are all made with provisions for wear. To be sure, the recent advances in the manufacture of steam turbines have caused the stopping of many reciprocating engines that were designed to run for a long time to come, but that is one of the freaks of progress that should always be expected, but which seldom comes. Textile machinery affords an excellent example of temporary design, as does also envelope and box machinery, and, to a lesser extent, printing machines. All of these have a history of constant advance, so much so that a machine 10 years old is pretty well discounted by the machines that have been put on the market since. Consequently there is not much reason for assuming that the future will be different from the past, and it hardly pays to put more money into such machines than at present. The result is that looms and other textile machines are crude in appearance and workmanship as compared with some other kinds of machinery. However, they fulfil their need, they last until something better is invented and placed on the market, and consequently there is no good reason for discarding them for lack of refinement or for making them any more expensive for the sake of longer life.

Printing presses have to be much more accurate in their movements than do textile machines, and yet they are not of the extreme refinement that is expected of precision machine tools or telescope mountings and the like. The latter, perhaps, represent the extreme of refinement, high cost, and long life. It is never expected that a telescope and its mountings will ever be entirely discarded or rebuilt. When a new and larger telescope is built the old one is still kept in commission and used for such work as it can do well.

**36. Design for Long Sale Without Change.**—A notable example of the use of a design without change is the Ford car. Where other manufacturers have brought out a new model every year, Ford has clung to the same car, and with the exception of a slightly less offensive style of hood and a few other minor changes it is the same as when it first

began to acquire nicknames. There are many other kinds of machinery, notably in the machine-tool field, that have maintained a place on the market for even longer periods without change of design, but they have not been so much in the public eye.

The requisite for keeping on sale without change is a mingling of conservatism with being ahead of the times, and with an entirely definite honesty of design and materials that is seldom possible. In the march of progress, there are always certain underlying principles that must be taken into account by the designer. If the machine is designed according to these principles and it does not break down and give trouble, it is almost certain to find some sale at all times. But, besides the qualities mentioned, it must in some way be ahead of the times when it is launched. If the principles are good, however, it is possible to sell things which are ahead of the times. When the Ford car was brought out, the public were still accustomed to see the old style of Oldsmobile with the little curved dash that reminded one of the still older-fashioned ice skates. The Oldsmobile, however, paved the way for a car which had the engine under a hood in front, instead of a single-cylinder engine under the seat, and also for a four-cylinder engine, which at that time was comparatively new but was sufficiently tried so that its success was certain. The use of these innovations by Ford was enough to place his car ahead of the times, but not sufficiently so but that the builder could keep up with his orders. Later, after other low-price cars outstripped his in appearance and comfortable riding, the fact of its dependability came to be an important thing. Exactly similar things have made it possible to continue certain machine tools on the market for 20 years with very little change. First, there has been a distinct advance over current practice, then an up-hill period during which sales have been hard to make, but satisfactory. Then a period during which competitors have perhaps created better designs, but have not maintained the quality of workmanship or material that has been held to by the original maker.

**37. Design for Quick Delivery.**—Certain products may be produced rapidly in emergencies, but there may not be sufficient margin of profit in them to justify the carrying of large stocks, or the prevailing styles may be likely to change overnight. For example, farm machinery is not likely to be ordered by the consumer until needed. He has no very great amount of loose capital, in fact he very likely has to go to his bank and discount his note to get the cash at all. He wants the machine delivered at once. Consequently, while agricultural-implement factories run the year around, they run the fastest when the demand is greatest. The latter statement is true of things that are subject to change in fashions, like clothing, hats, and so on.

In many cases the designer cannot change styles, but he can often meet the needs by designing methods of rapid production. The World War gave a wonderful opportunity for the doing of just this thing. Where previously it was expected that somewhere around three years would be given to designing and making tools and fixtures for any but the simplest product, during the war it was found possible to use machines such as flat turret lathes to do a great deal of effective interchangeable work that would ordinarily be put on automatic screw machines, and also to do a great deal of milling-machine and planer work without waiting for expensive jigs and fixtures, by making changes in the design which made it easier to hold the castings which were to be machined.

**38. General Considerations in Design of Product.** Because there are so many things to be thought of when designing machinery or any manufactured product that is open to variation, design should not be the function of one of the major departments alone. As a rule, a draftsman, or designer, is more likely to have the purely mechanical use of the finished product in his mind than any other, and he is, consequently, likely to resent what he deems interference, if the other departments take a hand in his results or if they ask pointed questions. The only way to avoid ill-feeling over designs is to secure draftsmen who realize that for their own

good they should seek out all the information possible before they are asked to take advice. It seems natural for one to wish to get the benefit of all available experience, but there are many draftsmen who fear that their standing in the eyes of the management will be lowered if they admit that there is any one in the employ of the firm who is capable of giving them any help. In such cases, criticism by a committee is likely to work out well, because then there is not so much chance to become personal. Of course, if the chairman of the committee allows members to make direct statements to the effect that the designer is a fool, there is more danger in the committee than without it; but it is presumed that a chairman is for the purpose of making the meeting impersonal. The effect of criticism of designs and criticism of persons is very different, especially if the designer is inclined, as so many are, to be temperamental.

**39. Design of Plant.**—In the natural course of things, plant design is a function of the engineering department, but, as in the case of the design of the product, there are many persons in the organization outside the engineering department who have suggestions to make that should be listened to. It is very seldom that workmen are asked to tell their views about new plant construction, and seldom that they are listened to if they try to make a suggestion. Nevertheless, they are the ones who make the plant profitable or not, and they know better than any one else what difficulties are placed in the way of rapid work on their part. Men are very adaptable, especially under the piece-work system, and they will learn to do work under very adverse conditions and yet do it smoothly and apparently efficiently. At the same time, they may know that a little change in the arrangement of buildings, handling devices, and so on, will make a great difference in the motions they must make and in the degree of fatigue they experience at the end of the day. Merely observing that workmen work rapidly and smoothly does not by any means show that they are efficient.

It is comparatively easy to lay out courses that work is to

follow, and to make them as nearly straight lines as may be desirable; but if straight line of progress brings heavy laborious work where it must be done under the intense heat necessary to some other part of the process, or if it makes it necessary to do work requiring keen eyesight where it will have to be done always by artificial light, or if it brings delicate work where there is constant vibration from other machinery, then all the advantage of straight-line production may be annulled. No one is so likely to catch these things in a design as is the workman who is to carry out the plans so nicely made. However, workmen have their temperamental troubles as well as designers. It is not enough to let one workman from each department see the plans in advance; several should be consulted. There is likely to be considerable difference of opinion among them, and besides that, men in shops are not trained to express their opinions, but only to withhold them. Moreover, in most shops it is not customary for men to be consulted about matters apart from the detail of the work they do, and when they are asked the first time they are not likely to take it seriously, but to suspect that they are being jollied about it.

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### EQUIPMENT

**40. Selection of Equipment.**—To a considerable extent the same reasoning applies to the selection of equipment as to the design of the plant. In past days when the owner of the shop was a graduate of the same kind of shop and knew from personal contact just what could be done on every machine that was offered, he did not need to consult other people so much, while as a matter of fact he did consult them more. He was so bubbling over with enthusiasm about his business that he could not help talking it over in detail with his older and more trusted workmen. Even some of the most hard-shelled of the old school of business men were most prone to have their confidants in the shop. They may never have directly asked for advice, but they at least gave their employes a chance to express their views.

The available equipment for standardized industries is



becoming more and more specialized. However, as a machine becomes more rapid in its action, and the greater its output, the longer is the time usually required for setting it up and preparing the work for it. The shop, if it has a sufficient supply of capital, has the choice of whether it will manufacture all its product in large lots to enable it to make the parts at their lowest possible cost, and store them away against the time when they will be needed, or whether it will manufacture in more nearly a hand-to-mouth manner and save the interest, insurance, and storage charges. This large decision must of course be made by the management, either intentionally, or, as too often happens, by leaving it to the shop superintendent to do as seems wise to him without any very definite knowledge of how much capital he is tying up or how much the firm has that it can allow to be tied up.

If the design of the product has been made on the basis of a long run without change of design, and the firm can depend on itself not to make every improvement that it happens to think of, then it becomes a matter of balancing interest, storage charges, and insurance on partially completed product, against saving in labor cost. Almost every job that can be done on an automatic machine has its minimum number that can be done profitably. The ideal situation is where every machine of that kind is kept permanently running on one thing, year in and year out. Such conditions are rare, however, as compared with the great quantity of work being done all over the world on a hand-to-mouth basis. Such things as the "dollar watch" which helped make the name of Ingersoll so well known, or the Ford car already referred to, justify specialization in machinery to the very last attainable degree. Other just as necessary articles, however, must of necessity follow the changing desires of the purchasers, and will require for their manufacture a much less specialized equipment. Again, and especially in woodworking and machine-shop practice, a special machine has no value that justifies it as a basis for credit at a bank, while the ordinary machine tools and standard woodworking machinery have a tangible and usually pretty well defined value and a ready

sale. Thus, while the shop organization may be presumed to have the best working knowledge of the equipment needed, the treasurer needs to have a complete understanding with the shop organization as to the capital available and the dangers incurred in sinking too much of it in non-salable equipment.

**41. Jigs and Fixtures.**—Whether jigs and fixtures should be determined on by the engineering department or whether the latter should merely make the necessary drawings for their construction under the direction of the shop, is a question which has been debated many times and which often seems to depend on the personal qualifications of the men in charge of the two departments.

The design of jigs and fixtures, if it is decided to use them, is very distinctly an engineering problem, but one on which the advice of workmen may very well be sought. The question of how far they will be used is, like the question of equipment, one in which the capital available, the length of time a design is expected to be used, and the accuracy and interchangeability of the work, enter. The management alone can determine how much capital can be spared. It should be borne in mind that jigs and fixtures are practically a complete loss except to a going concern, and that a slight change of design may make them a complete loss even then. Moreover, they cannot well be altered to meet even slight changes in design, for they need to be preserved to take care of the repairs that are likely to be necessary to machines made when the old design was in vogue. There is a rule of practice often used to the effect that no special fixtures or jigs should be made unless they will save their cost in a year's time. Such a rule is unsafe, because in some kinds of manufacture a jig that saved its cost in five years would be perfectly justifiable, but that is only in a case where permanence of design is well established.

After it is decided to make a fixture for holding any one piece of work, say, for example, on the milling machine, the engineering department naturally makes the drawings; in

some instances it may be well for the design to be accepted and the fixture made as designed, but in many other cases it is best to let every one who is likely to have the job look it over. For example, a large casting weighing 400 or 500 pounds is placed in a fixture weighing 1,000 pounds. If this is left without easy and obvious means for handling it on and off the machine or for turning it over if the piece requires it, then the fixture will be a constant source of unnecessary expense; while if it is provided with a pair of trunnions and a spreader for crane chains, it can be moved and turned over at almost no expense at all. Even in the case of the very smallest of jigs for drilling simple holes, there is likely to be opportunity for men who are constantly using them to give good suggestions. Very often in going through a shop men will be noticed using rigging of their own in addition to the jig that is intended to do the work. It may be a drilling jig and they may have to use a monkeywrench to hold it so that if the drill catches when breaking through they will not hurt their hands. This is a matter to be considered not only by the designer of the jig but also by the safety engineering department.

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### HANDLING MATERIALS

**42. Machinery for Handling Materials.**—In a watch factory, the problem of handling material in process about the shop is very small. If locomotives are to be manufactured, the problem becomes more expensive, but the solution is simple and is practically the same in all shops. Between these two extremes, there is a great range of shops where the handling problems have by no means been solved and where many more laborers are used than should be. At the very entrance to most shops it is common to find the unloading of coal and other supplies bungled, merely because at one time the wages of laborers were so low that it did not seem worth while to furnish a substitute for them. The actual handling of materials in process is, of course, strictly a shop job and must be done as rapidly as production progresses, with whatever facilities are afforded by the company, no matter how

inefficiently it is done. The total cost of handling may be very small or very large, according to the nature of the business. If it is a large problem, it is usually well handled, but the shop in which it is a minor item is likely to waste much of the money which it does spend for this purpose.

When these cases are analyzed, it is often found that the trouble is that the firm feels that proper handling devices will cost more than they will earn. This may be entirely true in some cases; but there is such a supply of expensive handling machines on the market that it is not always easy to remember that there are simple, inexpensive, and adequate means for expediting much of the work. Oftentimes a roller gravity conveyer that can be moved from place to place will save its cost in a few days. Where machines are arranged in rows and parts have to go from machine to machine for succeeding operations, these gravity conveyers do the work, and at the same time make it easier for the operator than it is for him to pick up the part from the floor or a truck and then set it down again after the operation has been performed. Inexpensive overhead trolleys save a great deal of floor space that would be required to keep open paths for trucks. Belt conveyers will carry the things up which have previously been sent down the gravity conveyers. The ordinary and much abused wooden rollers for moving machinery in emergencies can easily be made much more efficient if the men who use them would only learn the principles on which they operate. It is painful to see a gang of half a dozen men tugging away to get a machine around a corner when the machine would have rolled around with only two men to push it if the rollers had been "cut" properly. All of these things are very inexpensive compared with overhead cranes, Brownhoists, and such things. They do not take the place of the latter, but they do many things that need to be done, just as quickly and well as much more expensive installations.

The planning department is perhaps in the best position to discover these little ways in which production can be expedited, and on it will fall the burden if things do not move easily from machine to machine.

43. Even when the most expensive or the most efficient handling machinery is provided, there is always some work around the shop or yard which requires manual labor. Coal, if it comes in gondolas, must be shoveled over the side unless there is a hoist with a grab bucket to take out the most of it. Even then there is some hand work necessary. Very few shops are so situated that they can dig their foundation places by other than hand power. Some are fortunate enough to have an open gravel or other easily dug land and can do it all with steam shovel, but there are always emergency jobs not large enough for the use of a steam shovel, and which must be done by sheer strength. Therefore, there will always be need of a yard gang in every plant of even very moderate size. Such a yard gang is a necessary evil, but, if handled on the basis that that is all that it can be, it is likely to be a source of more trouble than any other part of the plant. Its personnel is likely to be made up of the most ungovernable men, and the very fact that they are distributed about the plant in small groups makes it easy for them to become discontented if one trouble breeder gets in a gang. The problem is a serious one, and since the whole yard force may in some cases not exceed 2 per cent. of the total working force, it is well worth while to pay enough more for their labor so that a better class of people will be drawn into it. During the World War, it appeared as though the time was just approaching when it would be necessary to pay more for having disagreeable manual labor done than for skilled but attractive jobs. With the falling off of business, the conditions were partly reversed and manual labor has felt it more than the highly skilled, but nevertheless the little extra apparent cost of raising the pay of a very small percentage of the employes is not nearly enough to overcome the gain in morale of the whole shop or the additional work that will be done by an intelligent yard force.

The yard force and all the helpers in the shop engaged in handling materials in process are usually under the shop superintendent, he being the one in the best position to keep them under supervision, but their work most vitally affects

the work of the planning department. The remaining laborers who attend to the cleaning of the shop are also usually under the supervision of the superintendent, but in some cases a separate janitor force is maintained, which may, on account of the care of the sanitary arrangements, be placed under the care of the medical department. However, the latter department is seldom in a position and hardly ever cares to assume the responsibility for work so distantly related to its own work, so all that the medical department does is to make a monthly inspection of all locker rooms and toilets.

**44. Yard Switching.**—If the plant is on a railroad and has switch connections in the yard, there is usually a pretty definite arrangement with the railroad by which the company keeps things clear and makes such repairs as the railroad may demand or else it loses its service. The tracks in the yard belong to the company on whose land they are laid, but it has merely physical ownership of the rails and ties. The railroad is in entire control, otherwise it will not risk its engines and cars on them. When there is use of the tracks inside the yard by the owner's engines and cars, these special cars or locomotive hoists should not go outside the yard limits onto tracks which may at any time be used by the railroad company. It is very desirable at times to have a light switching engine that can be used to move cars once set in the yard. A locomotive crane can be used for this purpose when not needed for its regular work, but such use is not economical when there is any other work for the crane, as it is not only an expensive machine but is very slow.

**45. Yard Trucking.**—Trucking within the plant itself is very often necessary, and the horse-drawn truck for short hauls has by no means been proved inefficient. Long-distance trucking, where the traveling time exceeds the loading and unloading time, is probably cheaper by motor truck than by horses. If the yard is well paved with sheet paving and the loads are light, the low-wheel electric truck is probably best, not so much because of any cheapness in first cost or operating cost, but because of the fact that these little electric



trucks can go on elevators and can take a load from a machine on one floor of a building and deliver it on another floor of another building without having to transfer the load at all, while with the horse-drawn truck it will have to be transferred twice. The relative costs of the different methods of trucking at any time and in any plant can be computed by taking into account the cost of horses, feed, and care and repair of trucks, as against cost of storage-battery charging, decreased cost of labor for loading and unloading, extra depreciation and repair of electric trucks, and the saving in space due to the narrow passageways required for electric trucks, which can make very sharp turns.

As a rule, the work of electric trucks neither overlaps that of the overhead traveling crane nor takes its place. The crane, as has already been explained, is a great saver of floor space, saving on an average at least 5 per

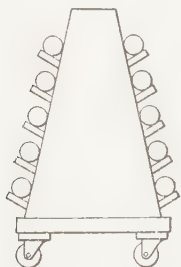


FIG. 7

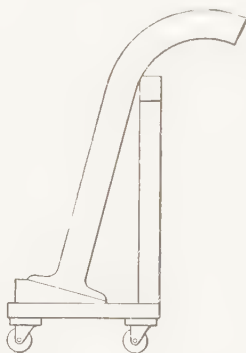


FIG. 8

cent. The electric truck is useful to bring things to the crane and to take them away, for which purpose demountable bodies or boxes that can be hoisted by light chains at the corners are desirable, both to make easy attachment and to make a respectable load for the crane instead of its having to make several trips for small loads.

Traveling cranes are a matter of necessity for certain work, and the border-line cases in which it is difficult to determine whether they are a necessity or not are few, but in those few cases the virtual addition of floor space resulting from the use of cranes is worthy of consideration.

**46. Special Trucks and Stands.** —Parts of machinery in process, that cannot be rolled from machine to machine, are advantageously handled by means of special trucks, such as shown in Fig. 7, which is a sectional view of a truck for handling spindles and shafts or automobile crank-shafts, or that shown in Fig. 8, which is used by a manufacturer of sensitive drilling machines. These trucks are mounted on substantial castors so that they can be readily rolled from place to place. They serve both to keep finished work from being scratched, and to keep it in shape for orderly movement about the shop.

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## METHODS OF ROUTING WORK

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### DEVELOPMENT OF ROUTING METHODS

**47. Conditions Influencing Choice of Methods.** Methods of manufacture can be classified as *straightaway* methods, in which the product goes in one direction all the time; and *assembly* methods, which may need the services of a planning department, as will be explained later.

Examples of straightaway methods are the manufacture of flour, of paper, wire, and so on, which require certain very definite methods that have already been standardized, but which are and have been subject to great improvement by means of automatic machinery. Thus, in the manufacture of rods from billets in the steel mill by the use of the continuous mill, the work can be made entirely automatic, even to cutting off the rod while it is still running at full speed. The processes are identical in principle with those of the earliest rolling mills, but the present-day machine does not look at all like the older types. Such manufacture becomes almost automatic in the hands of the men who have to attend to the transfers of material from one machine to another. When a man has trundled bundles of wire down a certain passageway for years, there is little need of a planning department to tell him to keep on trundling it so long as the supply lasts. The slack between machines, of which there must be some, is auto-

matically taken up by the men, since men of the type that will work at jobs of this kind are not inclined to do more than the circumstances dictate.

The greatest amount of inventive energy has been spent, in the past, on continuous or automatic production, and the greatest engineering feats have been performed in the attempt to reduce the human element to its lowest possible terms. This is entirely natural, as it is easier to measure the work of the engineer in such products than in general manufacture. Steel-mill product is simply weighed, and the tonnage is the basis for all computations. The grade is established by the analysis of the product, and every effort is put into rapidity of production. This is so readily measured that any change in methods of manufacture can be noted in the weight of the daily product almost at once, and it is so far independent of the human element that it is a really correct basis on which to rate the engineer who puts in the new system.

48. Where, however, the human element in production is in the ascendancy, the effectiveness of an engineer's plan cannot be so easily rated. For example, in a machine shop, it is always possible for a man who is well trained and who wishes to make a good record, to do anywhere from 50 to 200 per cent. more work than is customary in the average shop, using the same machinery and tools. And yet it is difficult for any one to say that men in these shops are actually loafing. They are busy visibly, but their minds are not on their work or they have not the mind to accomplish the results that they might. There is a very good example of this to be found anywhere that piece-work rates are given and the workmen do not fear a cut in them. There is seldom any flourish or evident haste in a piece-work shop. Every one starts the day at a pace he knows he can maintain; lost motion is eliminated by experience; and, while the men may not take the best method of doing the work, if left to themselves they perfect themselves in their own method so that they can readily and without undue fatigue turn out a great deal more work.

Under such circumstances, the promoter of new and more

efficient machinery is dependent on the human element to prove its value to a much greater extent than if his machinery were for some one of the continuous processes. He may find, when he puts his new machine in the shop, that the piece workers have perfected their own methods so thoroughly that his own expert cannot do as much with his improved machine as they are already doing with their old machines and crude ways. On the other hand, he may provide himself with experts to demonstrate his machine and find, when it is placed in a shop where the work is all on day rates, that the men use his machine with so little energy that it proves a disappointment to the management and he is requested to take it out, regardless of the fact that his own men can make it a very profitable investment. This very fact, that the management becomes practically helpless in the hands of its employes under the old systems of management, has led to various interpositions of departments between various parts of the shops.

**49. Reservoirs.**—In continuous manufacture, the product of one part of the process is transferred to another process, and one of these processes may proceed more rapidly than the other. It is not always possible to take up the slack between them, even within one machine. A notable example of this is found in the progress made in rolling wire rods. The earliest process required the passage of the billet through a pair of rolls. It was then handed back by manual labor to the side of the rolls from which started and passed through again. As it grew smaller, it cooled very rapidly and had to be reheated. The next step was to make a "three-high" mill and send the rod back between the two upper rolls and then through again between the lower pair, since the central roll turned steadily in one direction and therefore the upper and the lower rolls turned in opposite directions. This was a great improvement, but it required considerable manual labor of a highly skilled nature, and the two ends of the rod were unequally cooled. The end which came through first was the last to go back, and consequently it was impossible to get the rod of equal diameter its whole length. Then some one con-

ceived what is known as the Belgian mill, which consists of a series of three-high mills through which the rod is led so that it forms in loops on the iron floor of the shop. These loops grow larger or smaller according as the number of the passes through the various rolls is well or poorly balanced. Then American inventors evolved the continuous mill, which is simply a series of two-high rolls placed close together, and with passes that are closely designed so that there is no slack between one roll and another and so geared together positively that the increased length of the rod is taken up by equally increased speed of the rolls. In this machine, not merely does the wire rod not cool off, but it will actually increase in temperature, as a blacksmith used to illustrate by hammering a nail rod until it became red hot from his blows.

In this evolution of the rolling mill is illustrated exactly what has happened in many other cases. First, there was no effort to make rapidity of production anything but a personal matter. Then there was the introduction of a process that assured rapidity of production by the speed of the rolls that completed the product, and there was a reservoir, in the form of the loops of rod on the floor, to take care that no back tension was put on the rod in its later passes; then, last, the tuning of the machine so well that even when delivering rod at the rate of a mile a minute there would be no slack, but every part of the machine would be working at top efficiency.

So the first move in establishing efficient production is to locate reservoirs into which one process or series of processes empties its product, which in turn becomes raw material for the next step. The size of reservoir necessary is a measure of the efficiency of the shop, except in certain instances, as it exhibits to the eyes of the management material and labor tied up which should be in process and getting toward the point of salability.

Of course there are manufactured goods whose excellence is dependent on the action of time on the materials. Furniture made of green wood, varnished with quick-drying varnish and only half rubbed down, is not good furniture, leather not left in the tanning vats long enough is not good leather,

but these should be looked on as material in actual process, of drying or rubbing or tanning, and not as material in a reservoir waiting for a chance to be put through another process.

**50.** When a shop grows to the point where one man cannot longer carry in his head everything connected with the shop, or when the old superintendent who could do it by virtue of having learned it little by little, leaves or dies, then it becomes necessary to install some form of control that will make it possible to complete machines, or whatever is made, without resorting to the emergency manufacture of several small parts which have been overlooked. Firms are always reluctant to put in anything like a planning department, because it is expensive. No group of men of sufficient ability to handle a number of reservoirs of work can be hired for what a single superintendent will do his work for. Consequently, the planning department is never installed except as a last resort, or because some one in the organization realizes that it will have to be resorted to and does not wait for the emergency actually to arise.

A reservoir in its simplest form may consist of a man and a chalk mark on the floor. This chalk mark surrounds the man and encircles a neutral zone between two departments. All the finished product of the first department is delivered to the man inside the chalked enclosure and is receipted for by him. He in turn delivers it to the next department or departments, if he is at a dividing point, but only so fast as they can absorb it. This very simple reservoir, however, is expensive, as the man in charge must for his own protection know exactly what he receives and what he delivers and to whom. He must count pieces or weigh them, as his reports show the production of the preceding department and serve as check on the succeeding department and its records. Under a single superintendent this was seldom done. Each department made its lots large enough to allow for some spoiled work, and no one knew or cared where it was spoiled, whether in the last operation, where all the work so far done was lost, or in the early stages where little but the material was lost. The



superintendent did undoubtedly know pretty well where to place the blame if the allowed loss was exceeded, but he did not know where to give the credit if it was not exceeded.

It is nearly always well to combine the efforts of the planning and the inspection departments, though this practice is by no means universal; for it is important at each stage, not only to know how many parts or tons of material go through, but to sidetrack imperfect work so that more work shall not be thrown away upon it. It is human nature not to report spoiled work, but to see if it will not slip by and be credited, or to hope that the loss will be charged to some one else.

**51.** The gains from a reservoir system are, however, great, and much overshadow the cost, though they cannot always be measured in money. If the material in transit between departments is actually moved into the space reserved for the keeper and the inspector, it gives visual evidence of the slack in the organization, just as in the Belgian rolling mill the size of the loops of rod on the floor indicates the extent to which the different rolls fail to coordinate. If, however, the materials are kept at some other place, the records of the planning department must be depended on to show the conditions. Some superintendents are more impressed by actual castings and unfinished parts of machines, while others are impressed by figures. Inasmuch as these parts occupy the same amount of room wherever they are, it is apparently only a question of whether the floor space shall be closely covered with the machinery and the planning department have a clear floor space for its work, or whether the machinery shall be more widely spaced and the material be left beside the machine on which the last operation was performed until it is inspected and the next department is ready for it. The extra cost of dividing the transportation of the material into two steps, one from the machine on which the work was last done to the reservoir, and the second from there to the next department, can be made negligible by the use of trucks with removable bodies so that the individual parts are not taken off the truck bodies while they are in storage. In making the trucks

for carrying the parts, provision should be made for ease of inspection.

**52.** The reservoir system is applicable to the manufacture of goods that follow a fairly definite onward march through the shop, but which may have branches from the main line for special purposes. The manufacture of grinding wheels furnishes an example. Here the work goes forward in several parallel lines according to the kind of wheel being made. The vitrified wheel, which is the most used, goes through the processes of weighing out the grain and the bond, mixing, pouring into molds, air drying, shaving roughly to shape, burning in the kiln, truing, bushing, balancing, and testing. These are the rough steps; of course there are many subdivisions possible for each. For the sake of expediting the work, dams may be thrown across the path to form reservoirs as follows:



Reservoirs are not possible between the operations in the first column because the movements from one operation to the other are dependent on the condition of the wheel. For example, the time which a wheel remains in the dry rooms depends on its thickness more than on any one other element, as if too wet when removed it will crush of its own weight and if too dry it will crumble during the operation. Reservoirs could be put between the operations in the last column, but do not need to be, because each shop has some definite rule of its own as to how small wheels are to be before they cease to be bushed, balanced, or tested. For example, little wheels for dental use are not bushed, balanced, or tested, while a 4-inch wheel for a cutter grinder may be bushed and tested but not balanced, and all wheels over some definite size, say 8 inches, are subjected to all three operations.

A reservoir just before the burning operation enables rush orders to secure right of way, even though they are not for the wheels which the kiln loaders would like to use to fill out their kilns. And it makes it possible to see that a proper number of stock wheels are put in, though the demand may have changed during the time which has elapsed since the wheels were first mixed.

The burning process likewise requires a considerable length of time, during which stocks may have changed so much that another revision of requirements may be desirable after burning, so that certain wheels may be rushed ahead of others which have not sold so well; therefore, a reservoir after the burning enables the rush orders, which have been burned in the smaller kilns again to be given right of way, and makes it possible to insist that they get it. As with most other products, there are desirable jobs and undesirable ones. If the work is left to the workmen, the undesirable jobs will be allowed to lie on the trucks and the "soft," or easy, wheels will be pushed along, even though they are not needed. If the choice is left to the foreman, it is likely that the good jobs will be given to the best men, the ones whom he cares most about keeping, and the more difficult wheels will be left to the men for whom he cares less. That is, the work is likely to be distributed in reverse proportion to the ability of the workmen. A continuous flow of the work which is of most consequence in the filling of orders can be insured by reservoirs properly located.

**53. Development of the Reservoir System.**—Whenever a branch is found in manufacture, consideration should be given to a reservoir and a means for diversion of the proper materials to the branch. For example, in the manufacture of envelopes, they may all be cut in a single cutting room, but some of them do not require printing, some do not require gumming, most of them are folded by machinery, but a few are folded by hand. Therefore, after the blanks are cut they must be distributed by some one who knows the necessities and the promises of delivery that have been made.

Even in the manufacture of wire, which is usually given as an example of continuous manufacture, there are specialties. Some wire is tinned, some is galvanized, flat wire is rolled and not drawn like round wire, there are various special cross-sections to be made, and a spring department and a wire-nail department are very natural adjuncts. All of these diversions from the regular course require reservoirs which can control the flow of product from one department to perhaps a dozen others.

**54. Development of a Planning Department.**—A shop with two or three reservoirs like those described can place men of intelligence and good cooperating power in charge of them without any central head and be very successful, as each of such men will respond to calls from the others and will make suitable compromises between the needs of the sales department and the most efficient working of the shop. However, the moment a time is reached when for any reason there is not perfect coordination between the men in charge of each of these stations, there is need of a central department to issue instructions which these men will carry out. If this central department, usually called the planning department, is made by calling into the central office the men who, as managers of the reservoirs, have done the individual planning, it is possible to man the actual reservoirs with men who are not allowed to take the same responsibilities and who do not wish to take them. With such conditions, naturally the salaries in the central department will be larger and those in the reservoirs much smaller.

The men in the planning department's central office have the possibility of a greater influence on the company's earnings and good standing with the customers than do those of almost any other department. Production itself can be carefully worked out, jigs and fixtures can be made which enable a uniform product to be produced, and the inspection can be most careful, but the planning department can perform its duties effectively only as men for the position can be found who accept the spirit of the department's work and

who have the ability to stand out against the temptation to make temporary friends with workmen, foremen, the sales department, or the superintendent. In order that the needs of the sales department may receive proper consideration in the shop, the planning department should derive its authority from some one higher than the superintendent, possibly higher than the works manager, depending on the industry.

**55. Scope of a Planning Department.**—In the beginning, the scope of the planning department is determined by

ROUTE SHEET			
Part *611	Drawing *42	Order *1456	
	Machine	Fixture	Remarks
Plane Bottom	36"X12ft.	None	6 at a time
Plane Across	36"X12ft.	*24	6 at a time
Plane for Caps	36"X12ft.	None	6 at a time
Scrape Caps	Bench	None	
Drill Caps	24" D	*25	
Drill End	24" D	*26	
Bore	BM *3	*27	
Scrape Boxes	Bench	None	
Plane Vees	24"X6ft.	*12	1-Head & Tail together

FIG. 9

the timidity of the management, offset by the confidence that it has in the individuals to whom it entrusts the planning. Changes from the old order of things inevitably mean friction. The friction may be all concealed; but, even if the friction is only within the minds of people who are outwardly trying to make the change for the sake of pleasing the management, just so long as any one chafes under the new conditions there is not the efficiency that is desirable. Consequently,

it is desirable that the rate at which a change to a new method of organization is made should not exceed the rate at which the men in the organization can make the change in their own minds. For this reason, it is not always that a full-fledged planning department is put in at once. It may be evolved from a series of reservoirs such as have just been discussed; or it may be that a start is made at the opposite end of the line, in which case some one, possibly in the drafting room or engineering department, begins by making up routing sheets, such as are shown in Fig. 9, which become instruction sheets to the shop. When these are first presented, they may be put out as helps to the foreman; later they may be accompanied, in rush jobs, by red tags indicating the necessity for the work reaching certain stages by a certain date in order that delivery may be made when needed.

The shop routing sheets of the form shown in Fig. 9 cover the complete series of operations from the time the work is started into the shop, and the foremen are depended on to see that the work is handed from one to another. When there is friction or jealousy, individual orders may be issued to foremen to do a given operation on a piece or a lot of similar pieces. Sometimes it will happen that a clique is formed in the shop with the purpose of "getting" another foreman. A number of men conspire to make work come to him in such condition and at such times that he cannot deliver it where he should at the time it is needed, thus hoping to make the blame fall on him. Where such a condition arises, and the foremen are too valuable to let go, and probably only suffering from temporary childishness, the method of routing work from one to another is an excellent way to break up the play and to start a planning department at the same time. The forms then used are merely orders to a given department to do a given job, and to complete it at a given time, and to deliver it to another given foreman or to the inspection department or to whoever may be appropriate. While the plan is simple, it is an expense that cannot be lessened, because it requires clerical work by a mechanic, and that is always expensive; for there are so few mechanics that can do clerical work



that it is usually necessary to make two jobs, a mechanic to decide how to route the work and a clerk to make the orders. Once this is done, however, it is only a matter of gradual and slow expansion to have a full-fledged planning department.

**56. Functions of the Planning Department.**—The functions of a complete planning department cover the direction of all work in the shop, so far as it concerns methods of doing the work, routing it, and seeing that the methods and routing are followed. The planning department does not interfere with foremanship, in regard to the directions to the workman, but it does give definite directions to the foremen as to the machines to be used and the equipment to be provided for each job. The department usually has nothing to do with rate setting, nor does it usually exercise control over the erecting floor, except in such cases as erection or assembly is standardized and becomes a known or knowable quantity. Inspection usually goes along with planning, so that the department may catch errors of method as well as errors in operation.

As a usual thing, the work of the planning department begins with the material bought by the purchasing agent and ends at the erecting floor or at the final assembly; final assembly is here mentioned, for many times a partial assembly of units is made and these are in turn assembled into the complete product. The endeavor of a planning department is always to have work planned ahead of the shop, so that there is at least one job ahead of every machine and every man, to see that the materials, tools, jigs, and fixtures, and every other thing necessary to efficient production are at the machine before the operator has completed his last job, and that the drawings and every instruction necessary are at his elbow long enough beforehand so that he can know definitely what is required of him.

Planning is primarily a function of superintendence, but since the planning department is in a position to speed up any one part of the work or to slow another down, it should, as already suggested in regard to reservoirs, be in close touch

with the sales department, and be in a position to expedite work that requires it, and to see that red tags, signs of hurry, are not attached to things promiscuously without regard to the actual needs of the case relative to the rest of the jobs in the shop. The planning department should, therefore, be in a position to form a correct judgment as to the needs for hurry. Likewise it should have as long a look into the future as any one; therefore, the head of the planning department should be a man who is taken freely into the counsels of the management and who knows all their hopes and fears for the future condition of business, and he should reflect these things in the way he puts work into the shop. It is usually not a function of the planning department to say what product shall be made for stock as a whole, but the department is usually in a position to put into the shop enough of the parts that require long processes so that the firm will not be caught napping if orders begin to come in for quick delivery.

**57. Routing of Work.**—The first step of the planning department, that of routing the work, may be very simple and perfunctory, as in the case of a corset shop where all of the product goes through the same operations and the variations are within those operations. The other extreme, perhaps, is in the machine-tool business where there may be two or three alternative routings, which may be used according to the exigencies of the case. The routing of the headstock of an engine lathe furnishes a good example. The following routings are used, and several more variations are possible:

1	2	3
Plane bottom (flat)	Plane bottom (flat)	Plane vees
Plane across	Mill for caps	Mill for caps
Plane for caps	Mill across	Drill for caps
Scrape in caps	Scrape in caps	Drill end and bore
Drill for caps	Drill all holes (jig)	Drill bottom
Drill bottom	Bore for boxes	Scrape in boxes
Drill end	Scrape in boxes	
Bore for boxes	Plane vees	
Scrape in boxes		
Plane vees		

Diagrams showing these routings appear in Fig. 10. Of these it is evident that No. 1 has the simplest appearance.

This is the old way, still used in shops that have not the complete equipment which they would like. It does save transportation, but on the other hand the different operations require more skilled workmanship and give less certainty of interchangeability than either of the others. In No. 3 are included all the operations that need be performed, but all the drilling and boring is combined under one head and is done in one jig, but with interchangeable and quick-change drills and boring bars. One transfer to the scraping bench is avoided by making the milling work so close that it is not

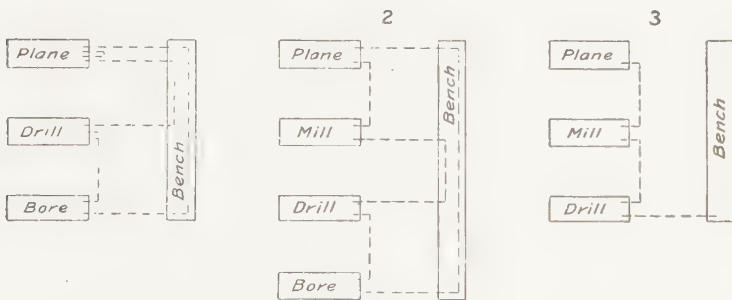


FIG. 10

necessary to scrape in the caps; this is entirely possible though not always attempted.

From this example, it is easy to see that routing work is not merely a question of using the most direct route geographically, but that it is always a compromise between the best methods of doing individual jobs and the best methods of attaining complete production. In such instances as have just been discussed, it is possible that it may be wise planning to change the routing of the work during its progress. For example, it may be that gang mills exist for milling the cap seats, but that they fit only one milling machine and that machine is tied up with a long and important job; then it may be much better to revert to the planer with its skilled workman than to let the work lag while waiting for the milling machine to complete its long job.

As a usual thing, planning departments are expected to do the best that can be done with the equipment and tools

that have been provided, but it is certainly part of their job to present new ideas to the management as to the best arrangement of machinery and the best machinery to have. They are in the very best of positions to have a comprehensive view of the whole matter, as they see the job as a whole, while an individual foreman sees only the flow of work through his own department and cannot be expected to give as much credit to the things which others say about the flow of work as he does to what he sees himself.

However, the planning department is also in a position to see the great cost of perpetual shifting of machines from one place to another, and is in a better position than any one else to realize the care which should be taken before being too much carried away with the craze for special machinery. Moreover, it should also be careful about the desire to cut down distance of travel between operations. Distance counts for little. It is the unloading or unfastening from one machine and the setting up and fastening on another machine that counts. A simple fixture on a planer or a milling machine so that castings can be made ready for machining in seconds instead of minutes will offset a great amount of distance travel. A sufficient supply of these fixtures or *cradles* so that they can accompany the castings from the planer to the drill will often make the drilling job so quick and simple that the castings might be carried a mile to another machine without costing as much as has been saved.

**58. Routing Work to Specific Machines.**—So long as work is routed in a general way and the instructions come to the foreman to plane this place before that one is drilled, or the reverse, there is little friction with or among foremen, though even then one will occasionally be found who disregards instructions so long as he can keep the work in his own department. When it is decided to have the planning department route the work to specific machines or benches then there is a very considerable chance that friction will be created. This may be handled in one of two ways. The most common is by means of a definite written or oral order

to the foremen. This stirs up all the antagonism at once and it all simmers down together, except in a few individuals who under this plan are demoted or dispensed with altogether. If the plan is strictly adhered to, there is not usually much trouble; but if the superintendent has a few favorites among the foremen whom he "tips off" that they make take liberties with the planning-department routing, or if he tells the men to come to him with any complaints as to the routings which the planning department may make, then there is little chance of any but confusion and probably ultimate dissolution of the department.

The other plan is to place the whole problem before the foremen in a written communication and then to assemble them and ask them to criticise it, not from their own personal standpoint but from the standpoint of the good of the company as a whole. If the matter is put to them as a thing that is made necessary by the growth of the company and not because of any lack of ability on their own part, and if they are represented by one of their own number in the planning department, then there is a very good chance of success, because the men who do not fall in line will not have the support of the majority of the other foremen.

It is perfectly true in almost every case that the installation of a planning department is not a criticism of the foremen. It means that the problem has grown so large that the men whose noses are held to the grindstone by force of circumstances cannot expect to have a large, broad view of the problem as a whole. Moreover, it has been the experience of all time that the good of the whole demands some sacrifice of the best of each part. Even in nature the vegetables which have the best leaves and the strongest stalks do not always have the best fruit. Corn raised for ensilage has no ears worth mentioning, and corn raised for the ears is not nearly so rank in growth. In just the same way the details of a business must be subordinated to the best interests of the whole. When this is insisted on, however, as when a planning department begins to route work to individual machines, then there should be some way by which each foreman and, if possible, each

workman should know what the interests of the company are and be in some way enthused with the spirit of the company and rewarded not only for personal efficiency but for cooperation and self-sacrifice. It should be fully recognized that it is a sacrifice for a foreman to allow others to come into his department and virtually "tell him how to run it," especially after the many years during which foremen have been building up reputations for themselves. However, if the management will show its appreciation for cooperation in the way that shows it most certainly and definitely, that is, through the pay envelope, then cooperation becomes a thing to be given, and it is only the most stubborn foreman that will forego an increase in salary for the sake of maintaining his own way.

**59. Visual Routing.**—It is easy to say that the planning department shall route work to machines, but routing is a very confusing job without some kind of mechanical assistance. The simplest possible plan is to have a large board with a peg for every machine and branch station to which the planning department may wish to route work. On the pegs can be hung tags giving the name or shop designation of the job to be done. Each tag stays on the peg until the job is reported complete. Consequently, there should always be at least two tags on every peg, one for the job being done and one for the next job to be done. Experience shows that some machines will have work assigned to them far ahead in point of time, and the pegs for other machines will be deep with tags for very short jobs. For example, the largest planer or lathe in the shop is usually in great demand and has to have its work planned far ahead in order that machines may have their largest part completed in time to begin assembly; but a key-seating machine may complete a dozen or more jobs in a single day.

In the case of the planer mentioned, the order in which the jobs are done is of considerable moment, but the jobs run long enough so that ample time is given for serious consideration of the time when other parts will be ready for assembly. The



key seater on the other hand usually has a great many short jobs and only a few long ones. The order in which the work comes to it is therefore not nearly so important, except that care must be taken to make sure that a long job does not have to be broken up to do some very short one. This is easily managed with the tag system, for a man can run through all the tags that have accumulated ahead of the key seater and pick out any jobs that must be completed at an earlier date than the time consumed by the long job will allow, and get them out of the way before the long job is begun. The tag system is simple and easily started, and makes it possible at a glance to see that every machine is provided with work. It also enables a subordinate department of the planning organization to get the tools and material to the machines before the work then being done is completed, and thus saves time spent by workmen getting these things, which necessarily would mean lost time for the machine.

60. The tag system does not fill all the requirements, because it does not show how the different parts of a given machine or lot of machines are progressing. Theoretically, each part of the machine should start into the shop at just such a time that it will be complete and ready for assembly at the same time that the principal member of the machine is ready to receive it. For example, in the manufacture of automobile engines, if it requires three times as long to machine the cylinder castings as it does the pistons, the pistons should not enter the shop until the cylinder castings are two-thirds done. Of course, it is not safe to plan in this way without any margin for errors and unforeseen delays, but within reasonable limits it is feasible. For the purpose of controlling this flow of parts, another board, called a control board, may be installed for each group of machines. This board would be arranged in some such way as is indicated in Fig. 11, in which horizontal lines represent parts of the machines being built, and vertical lines represent working days, dating *backwards* from the time when assembly should start. On each horizontal line a starting point, or time, for work on that par-

ticular part is indicated by the letter *a*. This point is located a sufficient number of days before the time for assembly to allow ample time for completion of the part, with allowance for delays. Back of this point is another marked *b*, which indicates the time when steps must be taken to supply the material needed, and *c* indicates the time for securing the tools and fixtures necessary.

When the time indicated at *b* is reached, inquiry is made of the stores department to see that the material needed is in stock or that steps are taken to procure it through the purchasing department. Then, when the time *c* for getting out the tools is reached, they are requisitioned from the tool rooms

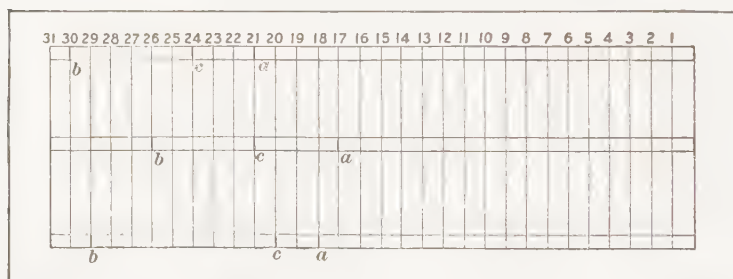


FIG. 11

and charged to the machine at which they are to be used. Then as the time *a* for starting the work is neared, the proper tags are made out and hung on the appropriate pegs on the routing board, which was previously described.

**61.** Of course there are many minor modifications of these plans. Some shops, for their control boards, use slanting shelves on which they place blocks bearing symbols of the parts, as shown in Fig. 12. Others use the shop orders themselves, instead of tags, on the routing board; but that is not good practice unless duplicates of the orders are made, as it is desirable for each tag or its equivalent to stay on the board until the job for which it calls is complete. The exact method to be followed is dependent on the product being made. A machine-tool shop might have forms very different from those

required by a manufacturer of ladies' slippers; but neither can be worked out without a thorough acquaintance with the work being done. Every one should be on his guard against blind copying of methods or forms, because in the same general line of manufacture, even in the same identical line, there is a great chance for different methods to be successful. For example, suppose that the work is the manufacture of wringers. All wringers look very much alike to a man who has only noticed that they are a necessary part of his home laun-

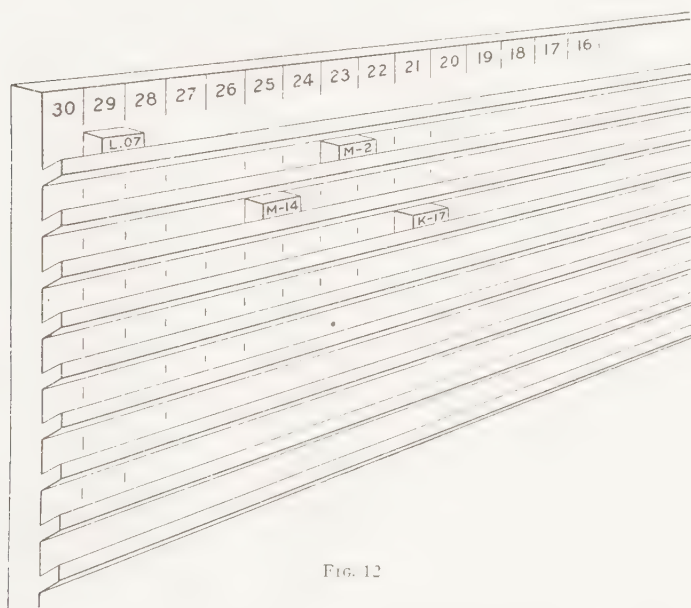


FIG. 12

dry equipment, but the methods of manufacture may be entirely different in different shops and yet each shop may turn out a perfectly acceptable machine. The routing in one shop may necessarily be quite different from another, owing to minor differences in design and to differences in equipment. The forms on which the different directions are given may need to be far different. For example, a small machine part requiring only a few minutes' total time for machining may have several operations performed that require a drawing on which are specified not only the dimensions of the piece, but

the limits within which the dimensions shall be correct, the material of which the part is to be made, and specific instruction that operations shall be performed in a given order because of the necessity of making some of the later measurements from a base plane not ordinarily used. All these instructions from the engineering department must be followed even though the planning department feels that it could do the work more efficiently if allowed greater latitude.

**62. Control of Tools and Fixtures.**—Under the old system, a set of tool-room checks was given to each employe, and these checks were exchanged by him for the tools for which he saw fit to ask. No limitations were made, and he went at his work as he saw fit, unless stopped by his foreman. Under the planning system, the individual workman should have very little reason for visiting the toolroom, but the tools and everything else needed should be brought to him at his place without any action on his part. It is true that there are many places where each man is still allowed to pick out the tools he wishes, but the number is growing less all the time. If the planning department knows enough to plan the work, it should certainly know what tools should be required. To the extent of honoring requests for tools at the proper time, the tool rooms should cooperate with the planning department. In fact, since almost all their dealings are with the planning department it is natural to count the tool rooms almost as a part of that department. However, the planning department has enough to do without adding to it the actual design of small tools and fixtures, which is strictly a mechanical matter, after it is once decided to supply them. So it is desirable to place all designing, whether of the product or the tools and apparatus for making it, in the hands of the engineering department, which presumably is in a position to do that best. However, it is necessary to check a true designer, as otherwise he will bankrupt any firm with his new ideas which he wants to see expressed in expensive metal before they are digested and before the public has been educated to want them.

The planning department, then, should function as the ordering agent of the company, so far as tool rooms and stores of materials are concerned. It should, therefore, be assured that its orders will be honored promptly so that there will be no danger of loss of production from failures to supply tools and materials as ordered.

Very few superintendents realize how much is lost through lack of prompt supply of tools and material. They do not realize, or they forget, how skilful men become at "stalling" on the job. No workman cares to call down disapprobation by appearing to be loafing, even though it may not be his fault. Therefore, as he sees the end of one job coming and the next job not in sight, he slows down, spends more time fiddling over his tools, finds a place where the machine needs readjustment, and otherwise busies himself doing nothing that advances production. If any one questions this statement, let him give his own private secretary only half the usual work for a few days and watch her spin it out so that she will always appear to be busy. The same thing is occurring in the shop every time there is a delay of materials, every time that a man has to wait for another man to get through with a machine or a tool. When, as often happens, an erecting gang has to wait for a special wrench, the whole gang does not sit down and frankly wait. They busy themselves doing nothing, or, worse than that, they take off some part that is already well fitted and pretend to be adjusting it again. To be sure, if they are on piece work they may put up a fight for more tools, but even then the habit of years of hour work has so strong a hold that they find it impossible to appear to be loafing.

The planning department, therefore, should be in a position to demand, and get, an adequate supply of small tools and fixtures so that the most efficient production is reached consistent with the size of lots that can be put through.

**63. Size of Lots.**—Manufacture ranges from entirely continuous manufacture, in which a continuous flow of material is always passing through each operation, to the manu-

facture of specialties, where a single machine may be under construction with no prospects that another will ever be made. Between these two extremes there is a great range of choice in regard to the size of lots put through the shop. The size of these lots is influenced by the knowledge that the sales department has of the market, the condition of the company's treasury, the state of the money market and the company's credit, and the nature of the shop's equipment. The planning department is the department which must carry the brunt of the load whenever it is decided to increase the size of the lots carried through. It knows, first of all, whether the equipment will stand the increase, whether each lot will take twice as long to go through the shop if the size of the lot is doubled or whether the setting-up time is so great in proportion to the time that is spent on the operations that the handling in larger lots will actually speed up production by the year even though it slows down the delivery of each lot.

#### **64. Effect of a Planning Department on Foremen.**

Under the plan proposed by Taylor, foremen in the old sense were to be replaced by men each of whom exercised certain functions in which he was an expert. These men were as follows: A teacher of quality of work, really an inspector on the job; a teacher of methods, motions, and procedure; a man to see that the most efficient speed was maintained; a repair boss who took over the workman's machine for the time being for any necessary repairs, whether to the machine itself or its driving mechanism; a time clerk, who exercised full authority over the workman so far as his relations to the pay roll and the reporting of work accomplished were concerned; the routing boss, whose business was to see that the work came to the workman in its proper order; and on top of all these was a disciplinarian.

While all this looks at first sight like flying in the face of Providence, and calls forth quotations about serving one master, the fact is that each of these functions is so fully defined in shops which Taylor reorganized that each man knows well to what foreman he is responsible for certain things, and each



foreman, knowing so well his own limits, is not tempted to go over into another man's field. However, not many shops have taken over the Taylor system unmodified.

The function of such systems which has made the greatest impression is that which the planning department offers, and even that function is very often used without any difference in the foremanship, except that the foreman finds that his choice of jobs for given machines and men is overruled. Theoretically this is right, but practically there is found to be a great difference in the ability of men who are of necessity entrusted with similar machines. If there is but one big lathe, then all the work over a given size must go to it, no matter what the method of routing is, but if there are a hundred 18-inch lathes, then there must be a hundred different qualities of men handling them. The man at the planning board cannot visualize these men and their qualities, and yet that is just what the foreman has to deal with. He may find that one man is really very good at thread cutting, but makes a fizzle of every face-plate job that is given him; and yet the planning department may very likely send a job of face-plate work to that very lathe, and the foreman has to spend a great amount of his own time getting the job done. However, a little tact on the part of the foreman will give the planning department this information and secure its cooperation, which may consist of some private mark on the planning board which signifies that all face-plate work should be kept away from that particular machine. It is only good cooperation for the foreman to let the planning department know these peculiarities of his men and equally good cooperation for the planning department to heed the advice.

**65.** Of course, every shop is likely to have foremen who know so much more about how the work should be done and how it should be routed through the shop, that they try to find flaws in everything that the department does. Naturally, they can find flaws, because it is so much easier to tear down than to build up. But if the shop is to be run for its best profit, the organization must be cooperative. Men who

do not and will not cooperate, in spirit as well as in material things, simply have to make way sooner or later for those who will. However, it should be borne in mind that a foreman who makes a constructive suggestion is entitled to be heard, and to know just what the objection is to adopting it, if there is any. If he is not told then, he is likely to think that there may have been an ulterior motive. Once he begins to be suspicious, there is no knowing just what he may do, for suspicion breeds suspicion; therefore, as a part of his education, the firm will find it advantageous to tell him just what the reason is. Not many foremen realize that the firm has any limitations in the expenditure of money, and not many realize the sales problem nor the dangers of overproduction, and unless these various sides of the question are explained to them they will judge the firm from their somewhat narrow viewpoint.

Foremen like to have a large amount of work from which to select the jobs for each man to do when the one he is on is completed. Such a condition is desirable from the standpoint of suiting the ability of each workman, which is something that is quite likely to be inefficiently done with a planning department; for there is seldom a great gain without some small loss. The gain in available room in the shop due to the smaller amount of work in process, and the gain in capital account from having less material in all stages of manufacture all over the shop, is enough to compensate greatly for this one possible loss. Many a firm has been driven into a receivership by the stock in process, which if turned into cash would have saved them. The only way to avoid having so much in the shop is not to start the material moving until the shop is in a position to use it. This does not of course apply to manufactures in which the material is required to season, as in the furniture business, but it applies even there so far as the room in the shop itself is concerned. Foremen, therefore, should be made to see the advantage to the shop as a whole which comes from having only live work going through and from the keeping of all the stationary material in store rooms if it is necessary to have it at all.

**66. The Planning Department at the Erecting Floor.**—It is plainly the job of the planning department to see that all the parts and tools necessary for assembly of the finished product arrive at the erecting floor when they are needed. The question arises, should the department attempt to plan the erection? This depends on the product and on whether the product is assembled piecemeal or all at once. If the product is a machine tool, like a lathe or a planer, the assembly is around a main casting, or bed, of the machine and all the parts are fastened to or fitted to it directly or indirectly. In most cases, the final assembly consists in attaching parts that consist of other parts already assembled elsewhere. In cases of this kind there is no doubt that the planning department should direct the time of assembly of the units which go to make up the completed whole, so that they will arrive at the final assembly at the proper time.

In other cases the assembly floor is too small for random erection work and the time of assembly may be fairly definite and regular. This applies to work that is manufacturing, in distinction from merely building a machine. An engine-building shop may make a series of small standard, stock engines, which are assembled in certain established ways and for which the assembly time is fairly constant because the parts are made with fixed tolerances. At the same time, they may build some large engines, that are made singly and the erection of which is not a known quantity and which it would appear to be foolish to ask the planning department to supervise, because it can only guess at the obstacles that will be encountered. There probably are instances in which the original drawings have been so well and carefully worked out that the machine goes through without alteration and all the clearances are found to be ample; but that is the exception that proves the rule and is very likely more due to luck than to skill. Generally, every new design is found to have some things that have been overlooked and some things that have to be changed, and that cannot be predicted by the builder. In such cases the planning department cannot fairly be asked to assume responsibility for the progress of the machine, but

it can be held responsible for the arrival at the erecting floor of parts which should fit into their proper places if the design is right.

In some cases, there are parts that cannot be completed until assembly has been begun. For example, there are certain bearings on many machines that have to be correctly alined, and the alinement cannot be made with certainty except on the machine, the parts being afterwards removed to make the fitting permanent. Such work is hardly ever within the work of the planning department, because it is an uncertain matter which is necessary to the perfection of the machine and which must be done well no matter how long it may take. It is, however, often possible to assign certain machine tools to the use of the erectors only, even though these machines may stand idle for a time, as the advantage of keeping the work of erection going continuously is of great importance.

# PRODUCTION ORGANIZATION

## (PART 3)

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### MANAGEMENT AND COSTS

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#### RATE SETTING

**1. Methods of Rate Setting.**—There are three ways by which rates are set: First, by allowing the work to go on in the usual way, noting the time required, and then setting piece rates or standard times a definite and arbitrary percentage less than the customary rate or time; second, by tentatively setting piece rates by a method which it is not intended to follow, finding out how rapidly the work can be done that way, and then establishing a new way of doing it as a result of the experience, and setting a new piece rate for the new way. The third method is to make up the rate by experiment and analysis of other jobs and then to set a scientifically accurate rate based on what can be done with the facilities offered. The first is the usual method, the second is ethically unsound, the third is apparently expensive but the cheapest and only sensible method in the long run.

The first method, the stop-watch method, is the one that has brought scientific management into disfavor in many quarters, enough so that many people judge scientific management by the stop watch rather than on its merits. Workmen almost automatically slow down as soon as they catch the click of the watch. This is entirely natural, and is the result of their experience. The first method is not honest, but it is perhaps no more dishonest than the second method mentioned.

It seems hardly fair, however, to ask a workman to be a party to the reduction of piece-work rates unless as he may bid them down in competition with others.

Moreover, public opinion is very much against treating labor as a commodity. There appears to be the same objection to ruinous competitive bidding for jobs that there is to ruinous competition among manufacturers for business. That is, the manufacturer who objects to price-cutting methods by the salesmen of his competitors should not be a party to rate cutting among his employes even though they may want the work badly enough to do it. Rate setting, therefore, should be done with due regard to the minimum wage, which is usually understood to be sufficient to provide a living according to American standards. Setting such a standard wage is, however, sure to work many hardships during times of business depression; for, if enforced, it compels manufacturers to lay off entirely many of their employes to whom half a loaf is better than no bread. The truly fair way to meet an inevitable slacking off of business is to give the men who need the work enough to do so they need not go too deeply into their savings, even though for the time it may give each family so little that they cannot maintain that comfort to which every one feels that they are entitled. Any minimum-wage law should, therefore, be so administered that in times of depression the work available may be distributed according to need, rather than according to efficiency. The manufacturer owes this much to the community that gives him the opportunity to exist. It must be borne in mind that, whatever good a manufacturing plant does in a town, the advantages must be reciprocal, else there is certain to be hard feeling and a loss of possible profits also.

**2. Rates for Women and Children.**—The primary reason for employing women and children is their willingness to work for less than men will. In times of great need they may be brought into the shops because there are not men enough available to do the work required. In any event, they act to lower the scale of wages in all activities; because,



even though they do not compete for the more laborious kinds of work, they relieve men who can compete for it. Of recent years there has been much agitation for "equal pay for equal work," which is undoubtedly right and which will very likely come about whenever women who work take the same businesslike view of the matter that is taken by men. At the bottom of the whole matter of unequal pay are found the women who work, not to earn a livelihood, but to supply themselves with extra luxuries over and above those which their fathers or husbands can afford. When such women sell their services at cut rates, exactly the same thing takes place that happens in any industry when price cutting begins. They want these luxuries so badly that they are willing to work longer and harder to earn them than their fathers would have to to earn the same money. Until they see it in this light, and decline to work except at the same rate as men would require for the same work, the employer to whom they offer their services can hardly be blamed for buying in the cheapest market.

3. Again, employers find that women do not by any means turn out equal work under the same conditions as men. Women are considerably more inclined to be absent. In many cases the percentage of absence is from 50 to 100 per cent. higher than with the men. They also require better working conditions. This last is, however, something that an employer ought to hesitate about saying, as women do not require any better working conditions than men ought to require. Safety devices, for example, have to be somewhat more carefully installed for women than for men, but largely because the public is more affected by injuries to women than by the same injuries to men. A man with a finger missing is hardly noticed, unless he is in a full-dress suit, in which case the loss merely becomes noticeable; but a woman with a missing finger knows that every one looks at it and remarks on it. A man crippled in any way now and for many years to come will be assumed to be a war veteran, regardless of whether he ever saw action or not; but a woman disabled in the same

way does not arouse sympathy, but only a resentment against whoever may have made her unattractive. However, the safeguards around machinery that are necessary for the protection of women workers are none too good for their husbands and brothers.

In the same way toilet facilities, lockers, and the general cleanliness of the shop all are things that demand more attention as soon as women appear on the pay roll; and yet they all are things that the shop might well improve for the men, unless they are already good enough for women.

4. The real test, however, is earning power under a straight piece-work system. A case has been known where a girl took up a piece-work job which had netted men around \$16 per week and made over \$60 on her second week in the shop. This was a case where she earned her pay, and under the conditions it was given to her. The men who had worked on the job previously were well laughed at by their comrades for their failure to make good on the job, but it never appeared but that they had worked well and faithfully. Usually, however, it develops that women, using the same facilities, do not earn as much week in and week out as the men do; they require more portorage, and they do not so readily make the necessary repairs and adjustments to the machines which they operate. If such is found to be the case, rates for them should be set according to what they do accomplish, with due regard for the fact that if they accomplish less than normal the overhead charges go up on account of their presence in the shop. They use just as much space for their work as men do, and usually as much power and quite as much light, and all these charges enter into the overhead charges which have really to be paid out of their gross earnings.

5. The same drawbacks that apply to the employment of women apply also to the employment of children, whether female or male. In the case of children, also, there is another kind of public sentiment and an increasing tendency of law makers to provide that children shall attend continuation schools, during working hours. These continuation schools

have already been discussed from another viewpoint in a previous Section; but, if ordered by law, they have to be reckoned with, whether they are efficient or not. The loss to the employer on account of the time taken up by these schools is more than the loss of the wages paid, because the time lost by the children increases the ratio of overhead charges to their wages. The gain from this schooling from the employer's standpoint is practically nothing for the time being, for most of the children look on the continuation work as a half holiday, and it takes them another half day to steady down after it is over. Then, the schooling that they get seldom has any immediate application to the work they are required to do or which they may be promoted to do. If it did, it might become more interesting and they might the sooner be ready for promotion.

**6. Practical Rate Setting.**—Rates set from the practical experience of the person who sets them are by all odds the most satisfactory of all. Next to these are the rates that are arrived at by proper reasoning and are deduced from experience. The first mentioned can be arrived at by making what amount to laboratory tests, trying different ways of doing a given job and then providing the shop with the tools and fixtures and adequate instruction so that the work can be done exactly as was found best in the laboratory. The man who makes the tests should not be a man who expects to earn his wages doing the work that he is trying out. He should be a mechanic who is selected for his ability as a workman and also for his tendency to work things out, in other words, his ability as a student, not of books, but of mechanical things.

A laboratory of this kind is simply a room into which the machine on which rates are to be set is sent, set up, and run on the product which is to be rated. The machine should be in a room by itself for the sake of secrecy, and so that the general run of men in the shop will not know how many failures there have been. The air of mystery that comes from having a separate room is also valuable, as it makes it possible

to secure cooperation through fear that the workman will not be able to do as much work with the new method as is required of him. Our course, with very large machines this is not possible; but what few experiments are performed on such large and expensive machinery have to be done in the light of similar experiments on smaller scale, so they become mainly confirmative rather than original. These experiments are both for motion study and for method of procedure. For purposes of motion study, the motion-picture camera is of great help, even in cases where the movements made are slow enough so that it would seem a simple matter merely to watch them closely. In cases of rapidly moving machinery, nothing except instantaneous photographs of one kind or another really shows what is going on. The motion-picture films when run very slowly through the projecting machine show all the awkwardness of the operator magnified many times, and at the same time they show the action of cutting tools on the work, and even the operation of a grinding wheel is made much more clear.

Experimentation should, however, always be carried on one step at a time. Any attempt to change more than one thing at a time between experiments results in confusion and doubt as to which change made the improvement or which decreased the efficiency with which the job was done. For example, in testing out a lathe job, the speed of rotation of the work should not be changed at the same time that the feed is changed, as no definite knowledge is then gained as to what it is best to change next. The work should, however, be done by a man sufficiently skilled so that he can reproduce the work commonly done in the shop, as to methods, and who is amenable to instructions to change first one thing and then another and allow the observer to note the gain or loss on each. However, it is not usually best to carry the changes in any one element of the work to a conclusion before trying changes in another element. For example, in a lathe job, it is not best to go to the extreme possible speed of rotation of the work before trying a change in the feed. It is, of course, possible that there may be two points of equal and best

efficiency, as the same work may be stiff enough so that a heavy feed and slow speed may produce the same effect as a light feed and rapid cut.

**7. Synthetic Rate Setting.**—Theoretically it should be possible to do away with experiment altogether and make all rates over the drawing board. That is, it should be possible to compute all the consumption of time in advance of the construction of even one machine. For example, it may be that a shaft is stiff enough so that any cut that the lathe will carry is permissible. In that case the rate of feed is determined by the kind of cutting tool used, and it may be safely assumed, if the shaft is of moderately low-carbon steel, that a cutting speed of 70 feet per minute is most likely to be efficient. Then it may be assumed that the coarsest feed which the lathe affords is possible, and the coarsest feed may be ten cuts to the inch. From that and the known diameter and length to be turned, it is easy to figure the actual cutting time. To this must be added the time spent in preparing the work, getting it into and out of the lathe, time spent in grinding and adjusting the cutting tool, and in making the necessary measurements. In the case of a shaft of, say, 5 inches in diameter, and 3 or 4 feet long, not requiring steady rests, this calculation method is entirely possible and, of course, very much cheaper than the experimental method.

However, a great deal of work, even in machine-shop practice, is not sufficiently rigid in itself to enable the fastest speed of the machine or the quickest feed to be used. A shaft may be so long and slender that the greatest care is needed, even in roughing it out, to enable it to be made true enough so that it will grind down to a true cylinder. Possibly experiment will show that it can be ground from the rough to advantage without sending it to a lathe at all. This might be deduced by a man of long experience; that is, a man who had performed many experiments, even though he might not have recorded their results except in his mind. Other work is usually done on a mandrel, and the fear of its slipping has formerly made machinists very careful as to the size of chip

they have taken. If it is still to be done in this way, it is likely that a man familiar with that work can tell how large a chip the workman will dare to take; but without experimenting he cannot tell, nor could the workman, how large a chip might be taken. On the other hand, if the piece is held in a chuck for the rough turning, the speed can be very definitely determined by computation, as can also the depth of cut and the feed. Since modern tendencies are all toward doing work by this latter method and obviating the necessity of slowing down production on account of the frailty of the work itself, there are more and more parts that can be rated without much experiment. This makes it possible merely to try one or two experiments on each piece of work to confirm the estimates made synthetically.

#### **8. Waste of Time in Placing Work in Machines.**

As soon as figures are available for the time actually spent in doing useful work, the apparent inefficiency of almost all shop work is brought to notice. In any ordinary machine shop the machinery runs, actually cutting metal, for an average of about half the time. During the rest of the time, the interest and depreciation go on; nothing stops except the consumption of power, and even that is so largely consumed in driving shafting and countershafts and in the idle load on motors, that the saving is very little. Anything done to minimize the time spent in getting a machine ready for a job, or a job ready for a machine, effects a double saving; first, in the actual time consumed, and second, in the saving of overhead charges in proportion to the work actually turned out. For this reason, when piece rates are to be set, every effort should be made to make, beforehand, whatever changes in design and tool equipment are necessary to avoid loss due to the parts, as designed, not having sufficient strength to stand machining in the most effective manner. The automobile industry has probably carried the designing of parts for economy in making to greater lengths than any other line of manufacture. There, in the best factories, very little work is done on a mandrel, save the last truing up of the parts, but everywhere it is made



possible either to use rapid feeds and speeds or broad-faced forming tools at slow speeds. Moreover, much work formerly turned in a lathe and merely trued in a grinding machine is now ground from the rough and finished in the same machine, and that, too, in some cases, with grinding wheels shaped to the outline desired and brought up to the work exactly as is a forming tool.

There is also a great waste of time due to lack of enough straps and blocking to set up a job on a planer or a milling machine in a proper manner. These machines are very expensive, consume a great deal of power, and occupy much valuable space. Moreover, the work which they do is apt to be on large and expensive parts of the product, which tie up considerable capital if held long in process. Often, however, such machines stand idle while the operator is hunting all over the shop for enough straps to fasten the work securely in place. Inasmuch as all the accessories that can be used on such a machine do not cost over 10 per cent. of its total cost, it seems like saving at the spigot and losing at the bung hole to let such waste continue.

9. Everything that has been said regarding machine-shop practice applies in some degree to all other manufacture, although it does not seem possible that the waste is so great, especially in the highly specialized industries like shoes, textiles, and wood working. In all of these, the setting of piece rates, or what is the equivalent in case of premium plans, etc., the base rates, needs careful study. In shoe and textile work, however, there is a very uniform practice, partly the result of union organization, and partly the result of inertia, so that there is not so much opportunity for investigation and study. Wood working is nearly as badly off as machine work, for lack of definite knowledge of the rate at which work can be done and handled. It is a revelation to a man accustomed to the leisurely ways of pattern shops and cabinetmaking establishments, to go into an up-country bobbin shop, or where pails or any other of the standard wooden products are made. It is natural to find that industries in which there

are a limited number of definite operations are much better understood and more standardized than is machine work, which has an almost infinite number of combinations of operations that must be worked out for each part. In a shoe shop the number of operations is variously given from fifty to one hundred, according to the method of manufacture and the number of operations that are combined with others, but these operations are well established for each shop and not nearly so subject to improvement as in less standardized industries. Rate setting in a shoe shop is thus a much less complicated matter than in a machine shop. The same thing applies in textiles, envelopes, and all paper-using trades like publishing, book binding, etc.; for in all these trades, with the exception of a few machines, there need be almost no loss of time between jobs, and the machinery can be in operation nearly all the time except while it is out of repair.

**10. Changes of Rates.**—The best method of rate setting is of course the one that secures a fair rate with the least expenditure; and yet this expenditure is really a capital charge and should therefore not be treated in a niggardly way. The benefit to be derived from established piece rates that do not have to be changed after they are set, except by addition or subtraction of uniform percentages as prices go up or down, is a great help to the morale of any shop. It takes years of experience, however, to convince a shop full of men that piece rates will not be changed if they do their best to accomplish all that they can under them. Once their confidence is gained, however, there is a wonderful advantage.

However, there is an inflexibility about a shop operating on a piece-work basis, for it is not easy for the firm to cut down the price of its product to meet the market. The only legitimate way to cut piece rates is to take a given percentage from every operation. This corresponds to a definite percentage cut in day rates and is just as hard to do. Then, with piece rates there is always suspicion and objection whenever an improved machine for a given purpose is brought into the shop, while such action hardly produces any effect in a shop

working on a day basis. There is always the fear that the new machine will be made the basis for a cut in rates which will be more than the reduction produced by the machine itself. All these contingencies operate to make men do somewhat less than they might day by day, so as to have a reserve for emergencies like a cut in rates covered up under some subterfuge.

**11.** Many times it happens that a firm is formed to manufacture something that is then fashionable. After a time the fashion dies out and the only market left is the legitimate one composed of people who have a real need for the article. In such cases, the price is almost certain to drop, and the shops that survive find it necessary to scale down wages in order to keep running at all. In such a case, it seems to be as well to prepare to let all the old hands go and hire new ones at the new rates. There is not much morale among a group of men who feel that they have been cheated out of the right to a good living, and yet, no matter how small the wage offered, there are always men who are ready to come in and try to do the work for a time at least. These new men may be floaters, but there will inevitably be some among them who have become tired of floating and who will like to stay in that particular shop if the non-financial rewards are sufficient.

**12.** There appear to be some very definite advantages in a sliding scale of wage rates based on the market value of the materials or of the product of the company, but with provision for an advancement instead of a cut if the workman succeeds in making a very good record. The actual setting of such rates is, however, a very delicate job, and it is an equally delicate task to put them in effect on the downward swing, which is inevitable whenever business is poor. In fact, the most difficult task of the rate setter is to find a way in which contraction in rates can be carried out without violence, at least of thought, when it is found essential.

**13.** There seems to be no chance that the time will ever come when violent fluctuations of business will not be preva-

lent, and so long as fluctuations persist, employers will have to be in a position to make wages fluctuate according to the cost of living and the market for the products of their shops. The upward movement is easily taken care of so soon as there is the money in the treasury to take care of it. The downward movement, while it is equally simple on paper, is not readily accomplished without a nearly complete change of help. Part of the difficulty with the downward change is due to lack of a complete understanding of the economic factors which enter into manufacturing, and part of it is the natural feeling that any one who takes away from another money that he expected to have is as reprehensible as the man who takes it out of another's pocket without the formality of establishing a right to it. For this reason, a form of payment that makes it apparent to all employes that a part of what each receives is temporary and due to abnormal conditions is a great help when reduction becomes necessary. The following explanation shows the reasoning upon which such a plan is based.

If, when the cost of living goes up 50 per cent., for example, the day rates, piece rates, and premiums are all increased by 50 per cent. and the whole amount is paid in a single pay envelope, the workman comes to think of it as an increase in wages, just as he would if the amount were a reward of merit. When prices go down, he does not see that his merit has decreased and he resents having a cut equal in amount to the former increase. Then, too, there are always a few employers who seek to take advantage of men's credulity and drop wages 10 per cent. which they had formerly raised 10 per cent. Only a few workmen really see that the difference is against them.

If, however, these increases, instead of being made a part of the weekly pay, are made entirely separate as a bonus, this whole trouble is obviated. The workman continues to look at his regular weekly pay envelope as his wages and at the bonus envelope as a bit of good luck to compensate for the way his grocer and landlord have raised their charges to him. This method is exactly as applicable to piece rates as it is to

day wages, except that under day wages a man may naturally expect an increase in pay from time to time as a result of his increased ability, which should show in his regular pay envelope rather than in the bonus envelope. Under piece rates these increases in pay to individuals are automatic; for, as he increases in skill and familiarity with the work, he is able to do more work and accordingly gets more pay, on top of which is added his bonus for increased cost of living.

#### **14. Handling Individual Complaints About Rates.**

No matter how well piece rates or base rates are set, there will be inequalities and inaccuracies. These, together with many that are entirely imaginary, will have to be considered as they are brought up by the workmen who feel that they are not able to earn the wages that they should. In some shops where these inequalities are well known and the management is reluctant to make changes, it is customary to give the poorly paid jobs to new comers as long as they will stand it. This method in itself almost assures that a sufficient number will leave in disgust to require the hiring of enough new comers to take care of the underpaid work. It is, however, a very expensive way of handling the matter; for it adds greatly to the number of men who should be classed as learners, and they are always expensive, and especially so if the investment in their training is thrown away by letting them leave before they have accomplished sufficient production to make an adequate return. It seems certain that every complaint in regard to rates should be thoroughly investigated and a demonstration made of the correctness of the rate. That is, no one should be allowed to go away without having seen the work done rapidly enough so that a usual wage can be earned. For that reason the department that sets rates should comprise on its staff enough thoroughly skilled workmen so that there will be no fear on their part that workmen can "show them up."

## INSPECTION

**15. Kinds of Inspection.**—There are two kinds of inspection; that for size, which may be as accurate as circumstances may require; the other, for appearance, which depends on personal judgment only. Most inspection in connection with manufactured products is for size. In the manufacture of furniture, pianos, and artistic goods of all kinds, the standard of quality is, however, very largely personal, but immensely vital. For example, certain few lithographers have reputations which enable them to secure prices for their work which must be greatly envied by their competitors. This reputation is established on the appearance of their product, and is usually found to emanate from some one man who knows what he wants and who simply insists on getting it. In fact, all kinds of inspection are finally reduced to a persistent and never-ending refusal to take anything except the quality of product established by the management.

**16. Systems of Measurements.**—Inspection by measurement presupposes an accurate system of measurement, such that articles may be duplicated accurately, not only day by day, but after the lapse of many years. Two systems of measurement are in vogue, the English and the metric. Many attempts have been made over a long period of time to secure the universal adoption of the metric system as the only system in this country, in other words, to make it compulsory. The most comprehensive answer to this demand probably lies in the fact that the system has been permissive in this country during all that time, and that if it were better for our use it would long ago have displaced the English system.

That the metric system has many advantages is apparent. It may be compared to the monetary system of this country. We would assuredly find it difficult to change from dollars and cents, with its ease of decimal computation, to the pounds, shillings, and pence of England; and yet, so strongly are we inclined to divide our units into other than tenths that we find many articles for sale at  $12\frac{1}{2}$  cents each, or cloth at  $37\frac{1}{2}$  cents



a yard, these prices being reminiscent of the old-time York shilling, which was an eighth of a dollar. We, however, overcome all objections to this system by thinking and acting in terms of dollars and cents, and we no longer concern ourselves with the mysteries of the shilling. In much the same way we overcome the complexities of changing from miles to feet and inches, by simply sticking to a single unit in the larger part of our work. We measure boilers in inches of diameter no matter how many feet the dimensions may prove to be. We measure buildings in feet and inches regardless of the number of yards, and we measure carpets in yards and fractions without regard to feet and inches. In weights we for the most part cling to the pound alone. To be sure, coal dealers mystify us by the use of the long and the short ton, but the hundredweight has gone almost completely out of existence. Almost the only place in the shop where any complexity arises in regard to measurements is in those few instances where feet and inches are used, and even there many advantages are found in the division of the foot into twelfths rather than tenths. A foot 10 inches long would divide without fractions into only tenths, fifths, and halves; but the 12-inch foot divides evenly into twelfths, sixths, quarters, thirds, and halves, which is quite an advantage.

The metric system is used by optical instrument makers, and to some extent by manufacturers of small tools and machines for export to countries in which the metric system is used. Lathe manufacturers, for example, have to furnish their machines with metric lead screws for export to France, but in general do not have to make the measurements of the parts of the machine conform to metric standards.

**17. Tolerances and Limits.**—The inspection department is principally concerned about the amount of variation that may be allowed from the standard called for. In the building of ordinary machinery, for example, where no attempt at interchangeability is made, it is customary if a piece is made too short to try to find some way to use it on the next lot by altering some dimension of another part. Such prac-

tice is, however, confined to things which are not strictly manufactured, but which partake more of the nature of custom-made goods. The moment manufacture begins to be on a large scale, it is necessary that there shall be such uniformity that the assembly room need not be a complete machine shop. In order to obtain such uniformity, it is necessary that the inspection department set, or have set for it, the limits above and below size which it may allow. Since it is most natural and easiest to make holes first and fit shafts and studs into them, the hole is first made of standard size or a limited amount under size, and then the shafts are made enough smaller to allow for a running fit, if that is what is required. An interchangeable drive fit depends on the elasticity of the metal of the two parts and on whether the hub of the part into which the shaft is driven is small enough to allow of stretching. As little as a tenth of a thousandth of an inch may be allowed for variation in small holes, but it is very expensive to set the limit so low that the holes will have to be reamed by hand. Reaming by hand almost always results in holes that are somewhat bell-mouthed; to secure the extreme accuracy referred to, the reamer must be started with its axis truly coincident with the hole which is already there. Machines are not made or kept in sufficiently good alinement so that it is possible to machine-ream to such small limits, so the only thing that can be done is to use a series of reamers with projecting guides which fit well into the holes as drilled. By grinding, holes may be produced of the degree of accuracy mentioned and without extraordinary expense, if the part in which they occur is readily held in the grinding machine. Large holes like the bore of an automobile engine can be ground on machines that are adaptable to other work that must be held in a fixture. These machines rotate the grinding wheel on its own shaft, whose center is the axis of the cylinder to be ground.

Once it is decided how much variation may be allowed in the size of the holes, it is next necessary to determine the allowance in size for lubrication. This requires a certain looseness of fit and permits of a considerable amount of varia-

tion in size of parts, as oil will take up the slack even though there is quite a large fraction of a thousandth of an inch difference in size.

**18. Place of Inspection.**—Once the limits of allowable variation are established, it is necessary to determine at what stage of the work to make the inspection. Shall it be on each piece after all the operations on it have been completed? That is the cheapest way so far as cost of inspection alone is concerned. Or shall it be at the machine after each operation is completed, and deal with the parts at once before other parts are spoiled through poor or faulty adjustment of tools, wear of parts, etc.? This last plan is expensive, because it is often almost as much of a job to find whether a piece is right as it is to make it. In a room full of automatic screw machines it may easily take more inspectors than workmen to keep the product up to a close standard and not spoil work as it goes through. In such a case, the inspectors become to all intents and purposes workmen to whom the machine adjusters are assistants.

Modern management, as it has grown out of scientific management, is more and more coming to make inspection in the shop and on the job a part of its organization. The inspector who has everything brought to him in a distant room is more impersonal to be sure, but this does not seem to be a case where impersonality is necessary. The whole efficiency of a shop and its morale is improved, especially on anything but day work, by making the inspection an intimate matter, following so closely on the work that there is no danger that time will be lost and work spoiled by letting men go ahead in wrong ways or letting poorly adjusted or alined machinery spoil the work.

The inspector, however, should be a part of a different organization from the workmen whose product he inspects. This makes it easier for the inspector to do his work fearlessly and carefully. If a workman and the inspector work under the same foreman, there is always pressure to let something pass that is not quite up to the mark, but which is

"practically just as good." It is just such exceptions that throw interchangeability out of the shop. Wherever there is a superintendent who occupies what is virtually the place of works manager, the inspection department is usually made responsible to him, and is included with the engineering department, the planning department, and so on, while the leading foremen and subforemen have direct charge of the carrying out of the orders of the superintendent. In theory, the planning, the engineering and the inspection departments are advisory to the works manager, but practically they give their instructions directly to the parties affected, unless in case of disagreement; in which case the charted course is pursued. Work thrown out by the inspection department should be accompanied by a tag showing cause of rejection, which should come to the foreman of the department in which the rejection takes place, so that he can determine whether or not the piece can be more cheaply saved than replaced. He should also have the chance to defend the workmanship if he disagrees with the inspection department. In some places there is a committee on rejections, which determines what is to be done with the rejected parts; but more often the decision is left entirely with the foreman. The difference in practice seems to depend on whether or not the nature of the business is such that the rejected part may be usable as material for a smaller part, as, for example, in the manufacture of grinding wheels, one that is spoiled for a 12-inch wheel may be turned down for a 10-inch, and so on.

### **19. Inspection and Test of Finished Product.**

The final inspection of the finished product is done on the assembly floor in the case of large heavy machinery, and in a room by itself when there is an opportunity to do so. Certain alinements should, however, be looked over by the inspection department when the adjustments are made, subject to being looked over again after the machine is pronounced complete by the production department, for fear that adjustments may have been jarred or pushed out of place. The final inspection of a machine should be under running conditions.

An automobile should not be turned over to a customer until it is known that it will run, and that the adjustments are such that it will run well and that it should give satisfaction. A milling machine is not ready for delivery until it is certain that it will perform all of its functions without jar, vibration, or chatter marks. The simplest machine, even if it is only a nut cracker, should have enough of a test to be certain that it will function as intended. It is not necessary in order to test out a power punch or shear that it be made to cut or punch up to its full capacity. The strength to do its work was given it in the design with an abundant factor of safety. If the machine will run at the standard rate and cut off a small bar, there is no need of supplying it with the power necessary to cut the larger bar. The same thing applies to all machinery, because the factor of safety in its design is, or at least should be, enough to make sure that if the experimental machine will do the required work, each succeeding machine will, if its mechanism is like the first.

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### SPEED OF WORK

**20. Importance of Proper Speed.**—Textile work depends for its output on the speed of the looms and other machinery, a wire-nail machine is belted to run at a given rate which the operator cannot change, a metal planer has but one cutting speed; but the weaver can keep his machines going a larger or a smaller percentage of the time according to his ability or disposition, the man who handles wire-nail machines can do the same, and the man operating a planer has the whole range of feeds from which to choose the most efficient.

A lathe or grinding-machine operator has a multitude of combinations of speeds and feeds available. His value depends on the proper choice. The foreman's chief function formerly was that of a selector of proper combinations in such cases; today if scientific management is carried to its conclusion the same thing is done by a *speed boss*, whose function is to

specialize in speeds and feeds. It is his duty to see that machines are actually running up to speed; that is, to see that belts do not slip or that motors are running at proper speed, and that the machine itself is able to deliver the requisite power at the point where it is used. The need of care in regard to the latter point is apparent in almost any shop; for it will often be noted that machines are not heavily enough belted or the motors are not powerful enough, to enable the machine to do the work of which it is capable.

There is no loss quite so unjustifiable as that due to a large, strong, well-designed machine staggering along and half running with belts tightened up to the last degree and yet not delivering the power which could be used to advantage. An example of such a condition was furnished by a 36-inch lathe designed and furnished for belt drive capable of delivering about 7 horsepower; but the machine did not work up to its real efficiency until geared to a 50-horsepower motor, when it began to do really effective work. Its production up to that time had been less than half what it should have been. The interest and depreciation on the machine, the rent of space it occupied, and the man's wages and share of overhead charges were about \$20 per day, so that the loss at the very least was \$10 per day, and the saving of this paid for the motor and the extra power used many times over in the first year after the change. It is true that designers of machine tools are paying much more attention than formerly to the power of their machines, but even yet most of them are designed by rule of thumb and entirely from past experience, and not from a scientific point of view.

Other machines, such as printing machinery, looms, and paper machines, appear to have been much further evolved in the direction of sufficient power, doubtless due to the fact that the purchasers and users of these machines are not mechanics and they feel no compunction about speeding them up faster and faster and then strengthening parts as they give way, until the maximum production possible with the material on which they operate is reached. A mechanic always feels reluctant to speed up a machine tool. He is accustomed to a



certain rather leisurely pace, which he considers inseparable from exactness of workmanship, and to go beyond that to him means injury to the machine. The employer whose only concern is production takes all that into account, he realizes that rapid wearing out of the machine is inevitable, but he likewise hopes that some one will invent a better one before the present machine wears out. He is concerned with immediate production, rather than with the preservation of machinery.

**21. Work of the Speed Boss.**—For the determining of questions regarding speed and power, specialists who are mechanical men, but not too mechanical, are desirable. They must have little mercy on the machinery that they are speeding up, but they must have the proper conception of the human element, because their work goes hand in hand with that of the rate setters. If a machine is speeded up and more production is obtained, then the man who operates the machine should be paid in proportion to the work which he has to do. If doing this additional work has brought increased activity, or if it has brought increased responsibility, both should be taken into account. It sometimes happens that a man who is all right when working at one speed will completely go to pieces and suffer a nervous breakdown if confronted with the necessity of handling twice as much work, no matter how much the pay may be. The mere fact of the increased speed of the machine may make another man so confused that he cannot stay on the job no matter what the financial inducement. For this reason it is necessary that the human side of these matters be given careful consideration. Many men appear to be slow, and to need “jacking up,” for whom that is the very worst thing that could be done. They are simply so constituted mentally that they have their pace and they cannot exceed it.

Laziness is not so common as is generally supposed. Many men who appear lazy have not the full mental equipment of the average man, and cannot, and should not be expected to, do all that may be put before them. Such men, however, are better off where the requirements are not great; their places are rather those of watchmen than of active participants in

production. They may handle material for automatic machines and report breakdowns, or they may work in many places where faithfulness is of more importance than initiative. It is in regard to such men as these that the speed boss must exercise care. If the employment department is sending him the wrong kind of men, he should see to it that the right specifications are given to that department, but in general he should not be troubled by precedent when he is looking into possible increase in production.

**22.** On more purely manual work, as, for example, the making of scraped fits on machine slides, the boss can only see that work is not accepted for scraping which can be brought nearer to truth by further planing or milling. He can see that the men who are employed are physically fit for continued exertion, and then he should endeavor to have them paid in such a way that they will put forth their best efforts. As a general thing, no other part of the work of assembly can be going on during scraping; therefore, all the time that can be taken out of that is so much gained on delivery of the finished machine and so much less time that the erecting floor is tied up with the machine. It is, however, necessary that scraping be well done, as otherwise it had best be left undone. It is necessary, then, that not merely physically strong men be employed, but also men of sufficient intellect so that they can reason, from the markings that the parts they are scraping make on each other, where the least scraping will produce the most effect.

Similar ability is necessary for all kinds of hand work, such as lapping bearings, laying out holes to be drilled, and so on. The intermediate work, that of machine operators, can be done by men of no very great intellect, and in some cases of no very great physical strength, if they are amenable to training and are sufficiently careful so that they can make their own adjustments of their machines.

### MOTION STUDY

**23. Application of Motion Studies.**—Motion study implies that after a study has been made and the motions that appear to be the most direct and efficient have been discovered, the men in the shop will be taught to use those motions in doing their daily work. The last part of this process is where the difficulty comes. It is not easy to teach people to make motions in a certain way, as any athletic trainer, dancing teacher, or other person dealing with similar problems will testify. Nor is it easy to follow the motions of other persons, as any of the pupils of these teachers will also testify. Motion pictures taken of people working or playing show some surprising things. For example, runners, who make every effort to win races and to establish records, have never standardized their gaits. Nearly all run with some awkwardness. Sometimes the winning runner has a beautifully smooth action, but he is likely at any time to be beaten by some runner whose awkward stride makes one feel certain that he is running largely on his nervous energy. Whether the awkward runner uses up his nerve supply more quickly than the other, it is hard to tell, for the champion is allowed so little time for recuperation and rest that he is almost certain to have to give way to another soon unless he is able to resist the social strain.

In this same way it is often found that the man who is producing the most work, day in and day out, is using motions that none of the other workmen would think of, so that he is not the example to put before the others. The whole matter is so puzzling that no definite solution seems to be possible. A great deal of good work has been done, not so much by trying to teach men new motions, as by providing apparatus such that the work will be less tiresome. For example, if a man has his work brought to him on a truck of about the same height as his bench, so that all he has to do is to slide or roll the material off, and if when his work is finished he can pile it directly on another truck instead of first putting it on his bench and then from there loading it onto the truck,

he has made the first step toward easy motion. If, however, the man is left-handed there is very little use of trying to teach him to be right-handed. If that was to have been done, it should have been done when he was a very small child, and the result even then would not have been at all certain. To try to get a grown man to change his natural way of doing things is almost as hopeless, but changes in machines by which all the handles ordinarily used will be conveniently located, and the provision of handling devices to make the manual labor as little as possible, are legitimate and profitable.

**21.** In the vocational schools or in any training for the manual trades, motion study or the teaching of efficient motions to a class of beginners is likely to prove valuable. Psychologists say that it is very important that in the learning process no backward steps be taken, that a person who has begun to learn to do a thing in a certain way finds it much more difficult to learn a new way than if he had no training at it at all. For the purpose of study, the motions of a person who does the work well and with the least waste motion should be taken as standard, rather than the motions of the person who makes the highest record. Gilbreth has used photographs of men taken against a screen marked in squares, so that the relative, and to some degree the positive, extent of motion may be ascertained. There are two things to be attained by motion study, one the elimination of unnecessary motion, the other the elimination of sudden stops and starts; in other words, the elimination of jerky motions. For example, a man swinging a sledge in a blacksmith shop or quarry will tire less in proportion to the work done, if he swings his sledge in great circles and does not follow the blow down hard on the anvil or drill, than will the man who makes his blows by raising and dropping his hammer in the same arc of a circle, and putting his weight behind each blow. While this is an extreme case, the same reasoning and experience applies to almost all work done in shops. It may be filing or scraping or it may be drilling by hand or grinding valves, the awkward man may have the best record and accomplish the most work because

of his will power, but the great number of employes cannot be expected to exert themselves except under the spur of increasing financial rewards, so that anything done to make the work easy for them and less fatiguing is likely to pay good dividends. It is especially noticeable that where the work is tiring the production falls off and accidents increase as the day goes on. This is noticeable in the hour before dinner and more so in the hour and a half before quitting time at night. It is not much altered by the reduction of hours from ten even to eight.

**25. Method Making of Motion Studies.**—The machinery of motion study is simple but expensive. It consists of a moving picture camera, a time clock with a large face, usually without any hour hand, but having a second hand making the full circle of the face, and the necessary ruled screens as backgrounds to show the motion made. Many motions would be better shown if two cameras and two screens were used, so that motions in three dimensions would be shown. Such equipment is not likely often to be provided, however, on account of the expense. Some good work has been done with an ordinary camera with a slow plate or else a poor light, but with the prominent and essential points of the operative, as, for example, his hands, chalked, or carrying a little electric light. For such work, the shutter and diaphragm should be set so that the total time of one complete motion will just give a complete exposure for the whole scene, then the lighted point will describe a curved line on the plate or film and thus show the motion of that particular point. These photographs are very interesting and instructive, even to the men who pose for the pictures, as they find that they have made involuntary motions of which they have not been aware.

### ATTENDANCE AND TARDINESS

**26. Importance of Regular Attendance.**—It is usually considered of great importance that every one be on time, stay the full time, and be on hand every working day. There are several reasons why attendance is desirable. Among office people and executives it is of great moment; for absence of men makes conferences impossible and causes undue delay, especially in the sales and order department, where a visiting customer or prospect is entitled to find some one on hand to attend to his wants, without any excuses about golf games or other social diversions. In the shop, it is desirable that machinery be kept in use whenever power is available, or, on the contrary, it is desirable not to have the power running except when men are at hand and work is being done on the machines. It is only where men are doing manual labor or when the machines are so driven that there is not a waste of power when they are shut off, that the hours of labor may be different for different people in the same room. Promptness of attendance is really a matter of discipline and morale. If some are allowed to be two minutes late, more will expect to be five minutes, and if five minutes, why not more, until people come straggling in at all hours of the morning? If they are held to prompt attendance there is a better feeling of fairness to all.

**27.** Tardiness is usually found to be greatest on Monday morning, dropping off on Tuesday and still less Wednesday. Thursday and Friday are about the same, with a substantial increase on Saturday, but not nearly up to Monday's high mark. Absences run in a similar way, but with a more marked difference from day to day, the low amount coming on Thursday and the high on Saturday. The combination of high absences on Saturday and high tardiness on Monday indicates pretty strongly the tendency of the workmen to follow the example of the management, and is usually found to be more marked as the management absent themselves over week ends, and to grow less when they restrain themselves.



**28. Remedies.**—Tardiness and absence seem to be curable, except such as are cases of necessity, if there is a close follow-up. If a man finds that he can be late or be away without comment, he takes more liberties. If he finds it necessary to state why he was away, he does not stay without a good reason (not excuse) or else he makes his arrangements in advance. So the first essential to prompt and regular attendance is a good follow-up. This may be formal, and consist of a regular report by the foreman as to both absences and tardiness and the reasons for them, or it may be simply a persistent campaign on the part of foremen, first to let each man have a chance to tell why he was absent or late, followed, in case he does not accept the opportunity, by a direct request for the reason. About two out of three men would rather “beat the boss to it” and tell why they were out rather than be asked, unless past experience has shown them that there will be no request at all. It is very desirable that every department have a record of absences and tardiness, whether taken from the time cards or reported by the foreman, so that undue increases may be checked up and the cause found. It is also just as desirable that the good records be discovered and the reason for them studied with a view of raising the standard of other departments.

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## COST KEEPING

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### REASONS FOR COST KEEPING

**29. When the Necessity is Apparent.**—In the shop, there is almost always feeling against the cost department. Not personal feeling toward its personnel, but a feeling that they are fine fellows, but it is a pity they are not engaged in some useful work; otherwise, in production. No good, visible to the men in the shop, comes from the activities of the cost department; and very commonly the cost department does add to the burdens of the shop by insisting that the shop furnish information from which to compute costs. The shop man's

position is that if he could find any way to reduce costs he would. Having reduced them all that he knows how, why spend any money finding out what they are? If, as sometimes happens, the cost department is months behind in its work, the shop man's position is not altogether without reason.

Again, it often happens that the principal owners of a manufacturing business, and certainly its superintendent and foremen, have grown up from small-shop conditions where no cost accounting was done, but where the cash balance in the bank was the all-important thing. Such men cannot be expected to know what a cost system can do for them; and when the force of growth compels them to have something of the kind, they very often make the mistake of going at it half-heartedly and without allowing sufficient funds to make a successful department. The history of many large shops shows a continuous line of wrecks of perfectly good attempts to form cost departments. The owners have hired good men, given them little to do with, learned something from each, and then thrown them out and gone along without a cost department, until circumstances demonstrated that they had to have costs kept and well kept. Finally, they have hired a man, perhaps not so competent as those who have preceded him, and have allowed him the assistance to make it possible for him to be successful.

If cost keeping were merely the keeping of costs as historical records the cost department might be of little importance. The true value of a knowledge of costs is to point the way to profits. If a shop is making a single line of goods in a single style, and is so situated that it must either keep on with that line or go out of business, then costs have less bearing on its business, except as a check on the management; but the vast majority of shops make more than one thing in more than one size, and have a choice of the range of their activities. In such cases, those in charge need to know which sizes and styles of their product are paying a profit, and which are showing a loss. They need to find out whether to drop a line or a style or whether to enlarge another line so as to make it profitable. A good cost department will show these things,

and also is a pretty reliable predictor of what may be expected in the future, and of what must be expected if materials go up or down and if sales fluctuate. For this purpose, however, the cost department must be an active part of production and must not trail along months behind the shop. When a shop gets over one hundred employes on its pay roll, the manager begins to need to use something besides mental arithmetic to know whether production costs are going up or down. A foreman may not appear to be doing things in any different way from that he has followed for years, and yet the cost of production in his department may be mounting higher and higher all the time. It may be that he has developed a "grouch" and that he is letting down or forcing down the morale of the department. There is no way to discover it without cost figures. He works as hard as ever, perhaps harder, but his work is futile because there is no smile back of it.

**30.** The fluctuation of the market for the finished goods may make it necessary that the cost of a part of the line be reduced or the manufacture stopped. If it is left to the foreman, he may be helpless; but if the cost figures are available, the management may take a hand in the matter or they may call in a consulting engineer, and cause more light to be shed on the matter than could the foreman. That is, while a foreman may be doing all that he can to reduce production costs, he is not always in a position to know of all the ways in which they can be reduced, nor is he always in a position to back his requisitions for machinery and equipment with the proper arguments to cause them to receive the attention which they should.

Moreover, it is unsafe to launch a new enterprise or to enlarge upon old lines of manufacture without having pretty safe estimates of what the future costs will be. In other words, it is necessary in the usual condition of business to eliminate the element of chance as much as possible. The fluctuations of the markets are serious enough, without having an unknown quantity in the form of unpredictable costs. It

should be possible at any time to learn from the cost department what the effect will be on the cost of any item of the product of the shop, if, for example, the cost of pig iron advances \$2.00 a ton, or if labor increases its rate 12 per cent., or what would be the effect of any combination of changes in materials, supplies, or labor.

**31.** Each department of the shop ought to know what is expected of it—at what it is aiming. Every one is entitled to a known target. There would be no sport in a shooting competition in which the targets were covered and only their general direction known. A definite and sharply drawn bull's-eye is necessary, and it is necessary to know the range. Just the same way, in the shop each department should know what is expected of it. If the department takes more time than was estimated and runs the cost higher than was expected, it will either ask for a revision of estimates or it will demand better facilities. It will not simply lie back and say that it did its best. If it makes a better record than was expected it knows that it is entitled to praise and will get it, for its work has been out in the open, so to speak, and is known to every one, even the general manager.

**32.** To others competing for the business in which the firm is engaged, the importance of cost keeping is very great. The hardest competition to meet is that of a business competitor who is going as fast as he can toward the bankruptcy courts because he has a false idea of his costs of production. Many small firms, just on the border line between being too small to keep costs scientifically and being large enough to have to, estimate their costs by adding to the direct labor charge a modest percentage, and then to that they add the cost of material, and consider the result to be their cost of production. Competitors of such a firm may find that their own overhead charges are much greater than this modest percentage, and they may so advise the firm, but the chances are that the latter will have to go through to a bitter end before they really wake up to the fact that a cost system is needed. It is for this reason that so much is being said about uniform

cost systems for competing firms. Associations of manufacturers get together and secure the services of a disinterested firm of cost accountants to develop a system of cost keeping that will show a concern exactly where it stands, not for the sake of exchanging confidences, but so that every one of the members can without individual cost have a system of accounting that will tell him from month to month whether he is making money, or spending the money which he should be putting into a reserve for depreciation, or which he should be using for some other purpose.

**33. Distinction Between Cost Keeping and Book-keeping.**—Costs are kept in books and cost keepers and bookkeepers look very much alike. There is, however, a considerable difference in their functions. If an expert bookkeeper is employed and put on the task of keeping cost accounts without experience in that work, he will undoubtedly find a way to keep cost accounts; but he is not likely to make a success of interpreting his figures so that the shop gets the greatest benefit from them. The bookkeeper is looking for facts relating to the financial condition of the shop; the cost keeper must go back of the facts to the reasons for them. The bookkeeper is a financial watchman. The cost keeper's work is constructive and he is part of the organization that furnishes the incentive to effort toward making more profit. For this reason a cost man must know the fundamental principles of manufacture, and he should know the details of the methods used in the particular shop in which he is engaged. This does not mean that he need necessarily be able to earn a living at the work suggested; but he must be a man of sufficient intelligence to comprehend the explanation of the shop man.

The fact that cost keepers can be hired, however, does not excuse any executive from the need of a thorough acquaintance with the principles of such work. He needs to know it well enough to understand its results, and so that he can judge of the recommendations made by his cost man. This need becomes greater as business grows in complexity, and without

this knowledge managers will undoubtedly continue to pay out dividends which have not been earned, without realizing that they are doing so.

**34. Divisions of Cost.**—It is natural to think of the cost of finished goods as comprised of cost of material, labor, and expense. The manufacturer has bought the raw material and his invoices show the cost of it, he has paid for the labor and his pay rolls show that. Everything else is expense, or, as commonly called, overhead charges. As a matter of fact, all of the cost is really for labor on the part of some one at some time or it represents the profit that others have made in the stages before the material became the raw material for the concern using it. As explained in a previous Section, each manufacturer has to determine what he will take for raw material; that is, how far back in the process he will begin and how far forward he will go. For example, he may carry on any of the processes by which iron ore in the ground is turned into watch springs. He may be a miner and do nothing to the ore except dig and handle it. He may run a blast furnace, he may run a steel mill, he may roll the product of his mill into billets or he may roll it into rods or he may draw it into wire or he may make watch springs, and, given the necessary capital, he can do all these things. If he does, he finds that the cost of his raw material is almost negligible and that he is paying out nearly all his money for labor. If he elects merely to take steel wire and make it into springs, it still follows that the sum total of the previous cost of the wire has been labor, just as much as it would have been if he had done all the things to the iron ore himself. The ore as it lays in the ground has no value, except as it is expected that labor will be available to make it useful. If every one went on strike and decided to starve to death before ending it, iron ore would be worthless.

During all the progress from this intrinsically worthless iron ore to the watch springs, there have been two distinct types of labor. That which directly enhanced the value of the material, and that which was necessary to enable the direct



labor to be expended at all, or, at least, efficiently. This latter type is called non-productive labor, which is convenient as a name, but is a misnomer, as all the labor is productive of something. For example, the springs when made must be shipped out, probably in boxes. The making of boxes in a box factory is very distinctly a direct charge against the product; but, if they are made in a spring shop, they are a part of the overhead charges, because in the sale of the product no extra and definite charge is usually made for the boxes. In the machine-tool business, where machinery for export is securely boxed, but where a definite charge is made for boxing, then the labor so expended would become a part of the direct charges and cease to be an overhead charge. In the same way there are two classes of materials, those used directly in the manufacture of the product, for instance, the wire from which the spring are made; and the other, the materials which have to be used, as, for example, the coal, the wiping rags or waste, the oil for the machinery, small tools, and so on, which are just as much an indirect charge as is the labor for making the boxes in which the springs are packed.

There are certain other expenses which do not come under the head of either labor or material, but which must be paid or which it is wise to pay. For example, taxes must be paid without regard to whether the firm profits from the expenditure of the tax money or not. It is wise, usually, to pay for insurance of various kinds. Depreciation has to be met, either by keeping up continual repairs and remodelling or else by setting aside a sum each year for replacements. However, taxes are ultimately spent for labor and supervision of labor in some way or other. The firm that pays taxes expects to have the benefit of good roads for its motor trucks, fire protection, and many other things that it is cheaper for the community to own and operate than for every one to have for himself. But all these things are ultimately the result of labor in some form or other.

It is very necessary to make in each case a distinct decision as to which expenditures shall be considered direct cost and which indirect, as otherwise certain charges may be made

twice and others not at all. For example, if a shop makes barrels for use in shipping its product, in general the cost of that department, labor, material, and its part of the overhead charges will be charged to overhead; but unless care is taken some of the overhead charges for the firm as a whole will be duplicated in the overhead for the barrel shop.

#### INDIRECT, OR OVERHEAD, EXPENSE

**35.** Overhead charges, or expense, must include everything that is not properly chargeable to direct cost of materials or to direct labor. These expenses, however, are again divisible between those incidental to manufacture and those incidental to carrying a stock of manufactured goods and to their sale. The shop cannot expect to have a great influence on sales, except perhaps as the engineering department through its design may make the sale easy or difficult. The sales department cannot help the production department, unless in a negative way by helping to keep the demands on the production department as even as possible and by not standing in the way of designs that help to make manufacturing processes simple.

From this it will be seen that there are two different costs, one the factory or shop cost, the other the total cost, above which comes the profit. These should be maintained separately, if only for the sake of giving the shop the credit or letting it take the blame for low or high costs in its department.

The division and prorating of overhead expenses in such a way as to show the true cost of each part of the product is a matter of great importance. It is of course perfectly possible for a prejudiced cost accountant to kill the hopes of almost any department of manufacture by throwing more than its share of costs upon it. For example, the cafeteria of a factory may be under control acceptable to the head of the cost department, and he can very readily swerve charges away from it which it would be entirely right for it to stand, or if the cost man so desires he can so burden it with charges that it will appear to be so unprofitable that it will have to be dropped.

In exactly such a case, flour used in the manufacture of a company's product was found charged to the commissary department, which had had no need for such quantities. The charge, however, appeared a perfectly natural one and would be criticised only by a person familiar with the circumstances.

For many years it was an almost universal custom to make all overhead charges a percentage burden on the labor cost, and to distribute the burden evenly and equally on every dollar of cost. It was found, however, that the addition of very expensive equipment made the apparent cost of everything made in the shop higher. For example, in a machine shop making small machinery, the overhead charges were about 150 per cent. A large lathe and a large planer were added, which increased the total overhead charges to 160 per cent. It is obvious that these extra expenses had not really raised the cost of making the regular line of goods, but that they should have been charged entirely to the small amount of larger and heavier work which made necessary the new equipment. The overhead charge properly distributed showed a profit in maintaining the old price on the small machines, but also made necessary a higher price on the heavier machinery which the new machines were employed in building.

The items of overhead expense vary in different shops, depending on the varying conditions. Those expenses discussed in the following pages are in general common to all production.

**36. Superintendence.**—The cost of superintendence is larger and larger as lower grades of men are employed or as the morale of the plant is decreased. Theoretically, it should be possible to hire workmen so skilled in their work, and so willing and anxious to do it, that the only superintendence needed would be similar to that of a traffic officer at the street corners, merely to keep hurrying people from being too selfish in their endeavors to increase production. Under certain conditions, such a state of affairs may be approximated. If the system of paying for work puts a premium on large and good production, and if there is adequate training of employes,

so that they do not become discouraged before they are productive, and if a proper selection of employes is made and there are suitable non-financial rewards for their encouragement, it is very nearly possible to reduce supervision to this desirable minimum. In such a case the workmen themselves really contribute to their own supervision, and the saving resulting from cutting down this expense must then be partly, if not wholly, divided among them. Without doubt it can in many cases be so divided with profit, for it will reduce the other overhead charges by a large amount.

**37. Salaries of Officials.**—The superintendence mentioned in the preceding article applies to the supervision of the workmen themselves. Next are to be considered the salaries paid to the president, general manager, sales manager, works manager, and so on. It is customary, if business is profitable, to elect numerous vice-presidents, who are heavy stockholders, or persons whom the stockholders wish to reward out of the ordinary, whose salaries are really a method of dividing the profits and yet not making it appear that large profits are being made. Some of the voluntary giving up of salaries of which we hear in times of depression is of salaries of this kind. The division of these salaries between manufacturing and sales overhead, and between the different branches of manufacture may cause a great deal of trouble. As a rule, this division is determined by the management or by vote of the directors, and, in some measure, the attitude of the management toward the different departments may be indicated by whether the charge is loaded on the departments in proportion to their apparent ability to carry it, or whether an undue portion of it is loaded on certain weak departments that the directors would like to have an excuse or reason for discarding.

In other cases, salaries are paid to men who are not owners of stock, but who are hired, either because no member of the stockholders wishes to assume leadership or is capable of it. In such cases, the distribution is most likely left, like other overhead charges, to the cost department, and follows

whatever principles that department may establish. In such cases, the salaries of the president, general manager, treasurer, and other officials assisting them or having similar functions, such as the legal department, if any, are prorated over all departments in proportion to the total business done by them; while that of the sales manager is distributed over sales alone, and those of the works manager and his assistants are divided between the production departments only, on a basis of their production. It may, however, be necessary to consider that some production departments almost run themselves, and also that the sales force has much less work to do to maintain sufficient sales in some departments, so that the sales manager may hardly give a thought to those departments other than to read the monthly reports of their activities.

**38. Rent and Interest.**—The items of rent and interest are grouped together, because they are of a similar nature and because they may come under one head in one case and another in another case. For example, in the hotel business, it is common to find that the real estate is owned by one corporation and rented to another composed of the same stockholders and with the same, or at least interlocking, directors. In that case, rent becomes a legal fiction; as normally the company would build its hotel, and the interest on its bonds, the dividends to be paid, and the taxes, etc., would correspond to the rent. In the case of a shop, rent and interest are clearly a part of the expense of production, whether paid as rent to some owner of real estate entirely separate from the firm, or whether they are paid in the form of interest, taxes, or depreciation on buildings owned by the company. Then, too, if the manufacturer owns his real estate, he is clearly losing the dividends that he might earn on that same amount of money invested in manufacturing alone; therefore, he should carry on his books a charge against each department, equal to a fair return as rent for the property occupied and used by that department. This is not always done, but doing otherwise is a policy that only camouflages the results; for a business that will not pay its own rent can

hardly be looked on as profitable. Of course, such charge does not affect the profits of the concern as a whole, but it does affect the relative costs of the different elements which go to make up that cost. For example, a shop making wallpaper may be located in a part of the city where land values are high, and it may use a large floor area. If the same company runs a picture-molding shop in conjunction with the paper-printing shop, it should divide the overhead charge for rent in proportion to the area used by each, rather than in proportion to the value of the product.

Undoubtedly the question of rent and interest would be carefully considered before the company bought its land and built its own buildings. If it bought land by the acre with a view to protecting its future expansion, it would do it with full realization that it would have to pay for its far-sightedness during the time when expansion could not be considered. Such land, unused but having a potential value, becomes naturally a charge against the whole business and may very well be prorated over the business as a whole in proportion to the business done.

Interest charges for what is practically fixed capital, and for loans to carry accounts, can be more directly charged to departments. For example, a firm may be carrying along what are sometimes called "frozen loans," or notes which are renewed as they come due, the money from which has been invested in machinery and equipment. Such interest charges should be distributed according to the value of the equipment used. The interest on money borrowed to carry customers' accounts, that is, the discount on notes received, and the interest on money borrowed to carry materials and labor on work in process, should be charged to the departments according to the amount of the money that each uses. The department that has to carry expensive stock should carry its share of the interest, and the department whose stock is of small value should pay proportionately less.

**39. Insurance and Taxes.**—The problem of income taxes is foreign to this discussion; but that of the ordinary



taxes assessed by the city on real estate and personal property is very much worth consideration by the cost department. Taxes are assessed with little or no regard to the returns from the property, and, in fact, without much knowledge of their effect on the business taxed. That is, they are assessed on all property visible to the assessors, who place on it a valuation and assess all property at the same rate, irrespective of the returns that it may be making in the way of profits. This does not make it necessary that taxes, as overhead charges, shall be distributed in the same way. On the contrary, since taxes are a contribution to the community, and it is expected that the community is making a full return of them in benefits, it seems right in making the distribution to take into account the benefits and to distribute the tax charges in accordance therewith. For example, a portion of taxes goes to the policing of the city, and saves the overhead charge which would be incurred by a larger force of watchmen and guards. A portion goes to maintain a fire department, which saves an expense to the company either for insurance or for its own fire-fighting organization; a portion goes for waterworks and sewers, which saves the company from having to put in a water-supply and sewage-disposal system, and so on. The portion of the tax allotted for each benefit would depend on conditions.

Insurance is also a community matter, one in which through the insurance carrier certain losses which may occur, and do average to occur, can be distributed over a larger number of people. The cost of insurance should, however, be so distributed that the more dangerous departments carry the heaviest burdens. That this is right would be seen if the company were to be reorganized into two concerns, one of which took over the dangerous work and the other that which is not so hazardous. The first-mentioned firm would then have a heavier overhead charge for insurance than the latter, and since it would compete with other firms also having high insurance rates, it would not find itself overtaxed in comparison with the rest. So, as a part of a concern with a total low rate, it should stand a proportion of the insurance cost justified by its own hazard.

This plan of distribution applies equally to all forms of insurance, and it applies whether the insurance is carried through an insurance company or whether the firm carries its own insurance. The expense is bound to be there over a period of years, whether it is recognized or not; and in fairness to itself the company should treat the expense as paid, even though the saving may be added to the profit account year by year for many years.

**40. Depreciation.**—For the present purpose, depreciation is only considered from the point of view of its distribution. The amount of depreciation will be discussed further on. Buildings, machinery, and equipment of all kinds depreciate by wear and by legitimate use; and they also depreciate through advance in scientific design and invention, which may render them obsolete. No two machines and no two buildings depreciate equally, however. Groups may be made of things that depreciate more rapidly than others. A wooden shed may depreciate rapidly, a brick power house may hardly be found to depreciate at all. Between these extremes, there are all the possible shades of difference. An interior telephone system may be rendered entirely inadequate by a new invention or by the growth of the plant which necessitates a larger system than the installation will permit. Certain things should hardly be allowed to appear on the inventory at all, but should be charged off from running expenses at once. The general depreciation of buildings is usually prorated over the different departments in proportion to the value of the buildings occupied and without making much distinction as to the rate at which individual buildings are going out of use. This does not seem just right; for, if it is intended that each part of the work shall carry the burden for which it is responsible, then each department should be charged for the depreciation for which it is responsible. If the work requires much trucking of heavy castings in certain buildings, then that work should carry the load due to excessive wear of floors. If the work is carried on in an open shed that serves merely to keep off the rain, it should not have to carry so much depre-

ciation as a department like the machine shop, which may have the most expensive buildings of the group.

**41. Spoiled Work.**—Low wages to incompetent employes, or high wages to able men who think the work beneath them, are both provocative of increases in the amount of spoiled work. If the shop were in the business of making only the piece of work that is spoiled, then the loss would be charged directly to the job; but inasmuch as the spoiled work comes more or less by chance and not from any intention of spoiling it, it seems wiser to make all spoiled work a general charge against production. In the case of production in large lots, this loss is anticipated by entering into the shop a larger number of parts than it is expected will be needed. If less than this excess is spoiled, the remainder is sent to the stockroom; if more, then the next lot is made that much larger and hurried so that some will be available before the first lot is entirely assembled into the machine.

Lost time is handled in much the same way. That is, men, when present and willing to work, cannot be refused remuneration because of their lack of material to work on or because of a breakdown of machinery. Such loss is not usually the fault of the persons affected, and is not under their control.

**42. Experimental Work.**—Almost every shop does some experimental work, and some have entirely separate laboratories and experimental rooms. This is for the purpose of keeping up with the times and ahead of competitors. Whether this is a part of production and should be borne by it, is always a debatable question, usually decided by making it a charge against the whole business rather than a burden on production alone. It is sometimes made a part of the shop organization, though that is not always wise. It is convenient to make the experimental department part of the shop; but there is always danger that if it is under the control of the superintendent he will shortly divert it to the work of the rest of the shop on the ground that he needs it, or else on the ground that it is too expensive to carry on. The purpose of such a laboratory is seldom that of reducing costs in the

shop, but rather it is preliminary in most cases to increased expenditures for new products.

When experimental work is done in the course of reducing shop costs, the burden should most surely be borne by the production department and by the department in which the expense is incurred.

Often it is wise to open a special account for these expenses and for experiment, and after it is determined what to do with the results of the experiments, to decide to what accounts and how rapidly the expenses shall be charged. For example, a firm may decide to design a new line of machinery and may build one machine and develop it. This may take two or three years. During that time, it would hardly do to say that any part of the cost should be charged to the regular production of the shop. At the end of that time, one of three dispositions of the matter is likely. In one case, it may be decided that the experiment was a failure, and it may be dropped for all time; or it may be decided that the market is not yet ready for the innovation and it may be laid one side for an indefinite time; or it may be decided to go ahead with the new machine, and the cost of this experiment may be charged off in five or ten yearly instalments to the account of the new machine, thus making each machine ultimately pay for its own development.

This is by no means a universal method, as some persons feel that the experimental work is an investment, exactly as is the machinery used and the building in which the work is carried on. There is, however, a distinction, in that the equipment and building are not necessarily a total loss if the business is suspended, whereas there is very seldom any salvage from experimental work.

**43. Light, Heat, and Power.**—Most commonly, light, heat, and power are made on the premises; but, in small installations, all but the heat is often bought through the electric meter, and large concerns may buy their power from distant waterfalls and by means of transformers turn part of that into light. However it is done, the three are very closely

related, and the costs for them usually prorated together on the basis of the average consumption of all three. It is obvious, however, that a department against which such charge is made may be using no power, or at least a very small amount, whereas another department may have a heavy charge for power and not use a great amount of light, as, for example, a department using electric furnaces in reduction work from which nearly enough light radiates to do the work. All the conditions should, therefore, be taken into account in determining how to distribute these costs.

**44. Watchers, Cleaners, Yard Force, Etc.**—Very little of the watchman's time is usually spent outside the production department, and yet the most responsibility may be for the office. Also, the cleaning may be so much more thoroughly done in the office that it appears to be very expensive; but this cost as compared to that of cleaning the whole works is likely to be small. It is probably cheaper to pay out money directly for cleaning the shop and to face the charge on the books, than it is to shut down early and have each man clean his own machinery and sweep the floor in his vicinity. The latter method is a favorite way of lessening the apparent cost of cleaning up, but it is not a wise one to allow. It is better to prorate the cost of cleaning between the shop and office on the basis of actual expenditure for a month or more, and then to distribute the shop's part according to floor area. This will not be right if the wiping off of machinery is included in the cleaning, but usually it is not.

Yard labor, such as unloading and loading cars, transportation within the works, and general digging and laboring work, is usually charged to general expense and prorated according to the amount of business done. In case building construction is going on, it is usually possible to organize an entirely separate gang the time of which is charged directly to the building. The same is true of almost all other special laboring jobs. Care should be taken in the cost department to know about such work and to arrange to have it charged to some special account until such time as the work is completed and can be

charged to some department or account or prorated, as the case may be.

**45. Other Indirect Labor.**—It is usually impracticable to charge directly to a job the work of crane men, tool-room keepers, foremen, timekeepers, and all similar employes who work on a great number of jobs but whose time on each can hardly be determined. The costs for such work usually are all classed together under general expense and prorated according to the total expenses of each department. This is usually done in spite of the fact that many departments do not have cranes, some do not have tool rooms, and there is a great difference in cost of supervision by foremen, as would be indicated if the pay of each were divided by the number of men under him.

**46. Classification of Expenses.**—For the convenience of the cost department and for the sake of continued uniformity, it is customary to make up what practically amounts to a directory of all accounts, including those which are charged to overhead. In such a directory is clearly defined the nature of the various items that are to be charged to each account, and a number or symbol is assigned to each account. Then there are equally specific instructions as to how to divide the totals, month by month, and to what other accounts to apply the amounts so determined. In this way the overhead charges are properly distributed to the various production departments and can be there prorated among the different operations on every different piece of work. It is, however, not often considered necessary to do this, except occasionally to see how the cost of repair parts should be changed, if at all, or possibly in some cases to show a workman how much the real cost of doing business is.

These general orders for overhead charges remain the same year after year, and the accounts come easily to be known by their symbols or numbers. Usually in small shops there are only a few accounts and they are designated by their initials, as G. L. for general labor, T. R. for tool room, and so on. As the business increases, however, they increase in number



and an arbitrary symbol, or just a number, is assigned. The symbols or numbers of those that are the most used are soon memorized by every one, so no delay occurs from their use.

**47. Starting the Job in the Shop.**—It is the almost universal practice to start all jobs into the shops by means of shop orders which are numbered serially, the blank order forms usually being made up in books with the desired number of carbon copies and numbered in order. A copy of the shop order is usually sent by the superintendent's office to every general foreman who will have to do with it, to the planning department, to the cost department, and to the time-keeping department. No labor should be permitted nor material assigned to the job without the authority of this order. It may very well be that the planning department will merely reiterate this number in each of the orders that it, in turn, issues to carry along individual operations upon parts making up the order, but the order must be the authority, whether given directly or merely quoted.

The source of cost data is the return from the workmen themselves of the time consumed on each job, which is identified by the number assigned to it. There are different ways of obtaining these returns. By one method, the timekeeper or a representative of the cost department visits the workman each morning and inquires as to what he worked on the previous day, and enters on a card the time spent on each job. This record is sometimes, but not often, made the basis for payment of wages by the day or hour.

A better way, except for very small shops, is to give the workman a card for each job, and to have this card stamped with the day, hour, and minute from which his time is to be charged. When the work is completed he brings back the card, and stamps on it the day, hour, and minute; the cost department can then compute the actual time expended. This latter plan is the more reliable, because it takes away the temptation for the man to prorate time that he has wasted on one job over several jobs, and it also brings to light any lack of cooperation which may have caused delay between

men or departments. There is some difference of opinion as to whether it is best for each man to have a new card for each day that he works on the job or whether he shall keep the same card in use day after day on a long job. The separate card for each day appears to be preferable. There is less danger of a man's losing a card if a new one is issued to him every day. Also, a long job may extend past pay days, when the man's time ought to be checked up with the work done.

**48.** Material is sent into production by a requisition on the stores either by the planning department or by the foreman who needs it, according to the system in use. As a rule, the stores department delivers the material in condition to be used by the machine in which it is to be worked up. Bar steel, for example, may be delivered in the full bar to the screw machines; but to lathes, only after being cut to proper length, and in some cases, centered. Castings, if not already cleaned when received in the stores department, should be properly cleaned and coated at least one coat of priming paint and filler so as to be in proper condition to deliver to the shop. The cost of cutting off steel or the cost of the preliminary cleaning of castings should be borne as an overhead charge by the store room, as such charges cannot well be distinguished among different order numbers. The same procedure in handling overhead charges should be gone through, even when the material bought is for a single definite shop order, as otherwise the costs may easily be badly mixed. The cost of all material emanating from stores on shop orders must be considered as the cost of material so far as production is concerned, though it is larger than the invoices show by the proportionate amount which it costs to run the stores.

**49.** In many shops a printed or blueprinted bill of materials covering all the material necessary for the completion of a shop order is handed to the stores at the outset, and sufficient time is allowed so that it is expected that all the material will be on hand when the work on the order is begun. If considerable time is required to complete the job, more capital is tied up by this method than should be, for it

is human nature to make the easiest or more profitable deliveries first. For example, in the building of wooden ships during the war, it was not at all uncommon to find practically all the other material delivered to the yards before the keels were shipped from the mills. In machine tool shops, if the parts of the machines are all ordered at once, the beds and other heavy castings will be delivered as soon as they can be made, but the orders for the smaller parts which are not so profitable may lie in the foundry for weeks before the parts will be molded. The planning department can very well pay as much attention in such cases to the time of ordering castings as to the time of starting the work in the shop.

#### **50. Method of Distributing Overhead Charges.**

From the shop order, the time reports, and the material requisitions, the cost of materials and direct labor for each job can be properly determined and charged. Most of the difficulties in cost finding consist in the distribution of the indirect expense, and in doing it soon enough so that it is of value. In the manufacture of machinery there are many instances where a lot of machines is begun and some of them are finished completely and shipped to fill orders already on the books, but the remainder, partly finished, are held awaiting orders which may require considerable variation from the standard. Such a lot may not be entirely completed for a year or even more from the time the order was first put in the shop. It is out of the question to wait for the completion of this entire number before knowing the cost. Yet that is precisely what has been done and is yet being done in some shops.

The requirement of the production department is that it shall be informed promptly whether production costs are down to normal or whether they are running high. There is no doubt in the mind of any superintendent that it is possible to save some orders from causing a loss by following them closely through the shop. What is needed is a means of following them intelligently—something that corresponds to the timing of a mile runner at the quarter, half, and three-quarters. A standard of achievement is required. If the work being

done is the building of a ship, the builders want the planning department to set a date when the frame is to be complete. If the work is the making of washing machines, the production department wants a date when the tubs, or whatever corresponds to them, shall appear on the setting-up floor. All this, the planning department is able to give. Where the inspection goes along with the planning, the work is held at each reservoir long enough to see that no labor is wasted on material already spoiled, and the cost man can then ascertain what the costs have been up to each reservoir. Excessive costs at any reservoir indicate that in the operations immediately preceding it, there has been delay, there has been too much work put on the material, or that too many men have had to be employed on the work. In other words, cost accounting and planning together give the production department something as a guide to work to, instead of having to wait until the whole job is completed before receiving even an inkling as to whether a profit is being made or not.

**51.** To be able to determine whether the work is proceeding satisfactorily, costs must be figured as the work goes on, use being made of an estimated overhead expense. That is, in each department, to the cost of labor employed directly on the job, there is added a percentage for overhead, determined by past experience, but which may be only approximately correct. Then, at any time during the month, the cost of the work done on any job can be found, correct up to the close of work the previous day, except for this minor error in the overhead charges. At the end of the month, the month's expenses are allocated to the departments, and each job is charged or credited, as the case may be, with the excess or deficit in the charges that were estimated. The planning department then reports which jobs are ahead of and which behind the schedules, and the cost department reports whether the cost is more or less than its estimate or previous experience.

This plan brings the overhead charges into constant notice by the management, which is a good thing, if proper conclusions are reached from examination and scrutiny. When over-

head charges amount, as they often do, to 200 or 300 per cent. of the total direct labor, it is evident that there is a great deal of potential profit that is, so to speak, "going up the chimney." If, however, the causes of this are not carefully scrutinized there is danger that the total cost of production will be increased rather than decreased in the effort to remedy them. For example, if it is thought that the number of laborers in a shop is too great and that the skilled mechanics are having too little to do, and therefore the number of laborers is reduced, it is found that the skilled men have to let their machines stand idle while they are helping each other. If this is the case, production falls off and more than makes up for the decrease in overhead charges. If, on the contrary, it is thought that there is an undue proportion of foremen, it becomes a question of whether it is wiser to hire higher grade mechanics, who can carry responsibility for their own work, or whether it is cheaper to go on with the higher overhead.

**52.** When attempts are made to create dividends by cutting down overhead, it is immediately noticed that there are two distinct varieties of overhead expenses; one, the constant and permanent, the other those that vary with the amount of business done. Taxes, rent, insurance, and depreciation all go on in the same amounts, whether the plant is totally idle or running full force. These expenses should be reckoned on before the liability is incurred. The concern that invests its capital in an expensive plant with permanent buildings does so knowing that they will be a charge against production, whether business is good or bad. The concern that uses temporary buildings located where land values are low knows that its charges for this purpose will be low, but also that it may not be able to get the low cost of direct labor that it might with better buildings.

There are, however, many expenses that fluctuate with increasing business; power, heat, and light, as a whole, vary, not directly with the amount of business done, but to some extent. If half time or half force is run, the cost of light may be cut one-third, of power a quarter, and of heat a little,

though in some instances the lack of body heat from the workers offsets the saving in heat for the few rooms that it is possible to leave vacant.

From what has been explained, it is evident that the cost of manufacture must increase very rapidly as the volume of business decreases. The reverse, also, is true, that as the volume of business increases the costs of manufacture decrease. For these reasons, a shop that is struggling along and barely paying dividends in ordinary times is able in busy times to pay the extra overtime rates that are exacted by the workmen for overtime work, and it also accounts for the great reluctance with which manufacturers decrease the hours of labor. It also accounts for the fact that working the shop at night with a separate gang often pays in spite of all the drawbacks to which it is subject. .

**53.** Many of the things which help to make up the overhead charges should seemingly be distributed over longer periods of time than others. For example, the minor repairs to machinery are readily absorbed as they occur; but, if a machine has to be entirely overhauled and rebuilt, the cost should seemingly be distributed over the several years during which it will be used thereafter. Some accountants meet this situation by charging the cost of rebuilding to the capital account, as if the same money were put into a new machine, and then charging it off through depreciation. Whether this is wise or not depends on whether the usual charge for depreciation is liberal or otherwise. As the income tax has taught manufacturers to assume rather rapid deterioration of machinery and equipment, the practice mentioned may be safe. In this respect, the income tax may be considered to have a good effect.

**54.** Another thing that is not altogether easy for the cost accountant to handle is the speculation in materials. Coal is usually bought, if the firm has the money or credit, when the price is thought to be lowest. Many firms maintain a six-months' or even a year's supply, because of the uncertainty of the coal situation. A firm that uses a considerable amount of



brass and bronze may buy copper and other metals in the same way. Manufacturers of furniture, pianos, and so on, have to buy lumber far in advance, so that it may have the proper seasoning. Should the interest on the investment, the depreciation, and the cost of storage of such materials be a part of the expense charged to production? Since all these purchases have been made with the expectation that the materials will be worth more at the date they are used than was paid for them when they were bought, it is no more than right that production should carry the charges. However, it is not right to dump the whole charge on any one month or similar unit of time. It should be spread over the whole time during which the investment is carried. Of course in some cases, notably wood for furniture making, the material appreciates in value, not only for the firm that owns it, but in the market. It is expected that coal will also appreciate in value, though it is more likely that the greater stocks of coal commonly found in the yards of large shops are more in the nature of insurance against shut-downs than of speculation.

**55.** Still another obstacle to distribution of overhead comes in the variable length of months, the varying number of shop pay days that occur, and the fact that jobs cannot all be begun on the first of each month and finished at the end of the month. Some concerns have gone so far as to keep their cost accounts by the week, or to make artificial time units of 4 weeks instead of months, thus getting 13 units in the year, or, if the end of the month does not fall on the end of the week, they make a division in the weekly pay roll where the month ends, so that each month's costs, direct or indirect, can be separated out.

**56.** From all that has preceded, it is seen that absolute accuracy in cost keeping is difficult to attain and most of the difficulty is in connection with indirect expenses. Yet, without a close approximation to accuracy, there will be so great a difference between the figures of the cost department and those of the accounting department that faith in the costs is impossible. It is therefore necessary that in the distribu-

tion of indirect expenses some approximation be made that will be fairly simple, easily understood and readily applied. Various methods are in use, each of which has its advantages and each of which, unfortunately, has its drawbacks. The more common methods are described in the following pages.

**57. Distribution by Tonnage.**—Industries such as the production of steel, copper, and so on, reckon their product in tons; they also keep account of their overhead charges in terms of tons of product. This method is usually safe in such cases, because the overhead costs are almost certain in amount and their fluctuation per ton is related directly to the amount of output.

**58. Distribution on a Basis of Labor.**—The method of distributing overhead charges on the basis of direct labor is perhaps the most frequently used plan, labor being the largest item of expense in many kinds of production, and the things which fluctuate most being dependent on labor. If the indirect labor and other expenses were proportional to the direct labor, this method of distribution would be correct. However, as has already been explained, they are by no means proportional. Under this plan the man who is working on the erecting floor with only a few wrenches and screwdrivers for equipment is charged with as much of the expense as is the man who is working at a machine that cost thousands of dollars and occupies a large amount of factory space for its operation. The man who is working at top speed and using much more power and oil, and is depreciating his machine faster, carries only the same part of the shop burden as he would if he were killing time and doing the least that he dared; whereas, if the calculation is carried to a conclusion, it is seen that a man can work so slowly that he not only is unprofitable, but he should be assessed rent for the space he occupies and the machinery that he prevents others from using.

When the overhead charges are distributed to the various departments of the shop, and those departments are made, as often is the case, on the basis of similarity of equipment, then the method of distribution on the basis of direct labor is rea-

sonably fair. In such a case, the heavy machinery is grouped in a department by itself, and is served by a traveling crane, which it shares with the erecting floor. The smaller machines are in galleries and are grouped in departments by themselves.

**59. Distribution on Man-Hour Basis.**—The method of distributing overhead charges on the basis of man-hours is based on the total number of hours worked by all the men employed, without reference to their varying rates of pay. By this method, the total number of hours worked by all the employes during a given period is divided into the total overhead for that period, and the average cost of overhead per man-hour is thus obtained and added to the direct cost of every man-hour worked on each job. This method has the advantage that it takes into consideration the fact that speed of production cuts down real costs, but it does no more than the system based on wages to account for the differences of equipment used.

**60. Distribution on Machine-Rate Basis.**—When the method of distributing the overhead on the machine-rate basis is used, what is practically a rental is charged each machine, or "station," in the shop, the total of all the rentals making up the expected overhead charge. If all the expenses that have to be borne by the production department were of the same nature as rent, this method would be the best way to make the distribution. But the indirect labor is not incidental to the machine, it is incidental to production, and that in turn depends on labor and the efficiency of labor. The machine-rate method places the charges for rent, insurance, taxes, and interest better than do the methods based on any of the things before mentioned.

The machine rate is found by allocating to each machine a share of the yearly expenses that is proportionate to the cost of the machine, its equipment, and the space and power that it takes. This amount for the machine is then divided by the number of hours that the machine is expected to be in use for the year, and that hourly burden is added directly to each

job as its time card comes in. This method is admirably suited to prompt cost reporting, which is a merit of great importance. The weakness of this system is most noticeable when the machine runs for a longer or a shorter time than was expected. It is apparent that costs calculated with overhead charges figured on the basis of operation for a 3,000-hour year are entirely inadequate if business conditions make it necessary to run half time. Likewise, they do not credit the saving in overhead if the plant runs overtime. The one error is as bad as the other. If the plant runs short time the cost reports may indicate a profit where none exists; and if the shop is forced into overtime work, the reports do not show the increased profit, in fact they may indicate a loss where the accountants' books show a profit.

**61. Compromise Methods of Distribution.**—The advantages of the machine-rate method of distributing overhead and the accuracy of the wage-rate method have led some to combine the two, and make one charge to each machine to cover those items that are stable and that have more of the nature of rent, and another charge, usually smaller, against the wages paid for direct labor on the job. This method of computing cost is illustrated by the following example:

Machine No. 57 is in use for 18 hours; it is run by John Jones, who gets 72 cents an hour for his work; the hourly rental for the machine is \$1.50; the overhead charges are 75 per cent. of the direct labor cost.

Costs other than for material are computed as follows:

Jones' time, 18 hours at \$.72.....	\$12.96
Machine rate, 18 hours at \$1.50.....	27.00
Wage rate, 75 per cent. of \$12.96.....	9.72
Total labor and overhead.....	\$49.68

This method is subject to the same criticism, in only a less degree, as is the machine-rate method, but if used like the wage-rate method, as a means of judging costs day by day with the proper allocation of actual expenses incurred at the end of each month or whatever unit may be taken, it becomes a very workable and fairly accurate method.

Mr. A. Hamilton Church has summarized this division under the following heads:

	DISTRIBUTED BY
Land and buildings.....	Floor area
Power .....	Actual use
Lighting .....	Floor area
Heating .....	Floor area
Organization expense .....	Proportion
Supervision .....	Special arrangement
Store and transportation.....	Special arrangement

While it may seem that the expense of installation of such a system might be great, it is not so complicated as it appears. There is, first, the division of the entire plant into departments for the benefit of the planning department and the cost department. There may be one foreman over several of these departments or there may be a department shared by two or more foremen, but the division is made according to the amount of the investment and the nature of the work done. For example, all the gear-cutting may be grouped together on the cost books even though the machines may not all be in the same room. All the planing in a woodworking establishment may be grouped together for cost purposes, as may be all the painting and finishing. The machines or the work may not be physically in the same room, and there may not be even a chalk mark to show the boundaries of the cost department's division of the shop, but within these imaginary boundaries all the overhead rates for distribution by wage rates will be the same, and most of the machine rates will be alike. The variations in the machine rates will be only on account of a few extremely large and expensive machines and will not add appreciably to the labors of the cost department.

**62. Summary.**—As was stated in the beginning of this discussion, simplicity and easy application of cost methods are greatly to be desired; but, no matter how complex a system is necessary, it is futile to install any system unless it will give the results needed. It is uneconomical to have a cost system that is purely historical. It must foretell reason-

ably well what the costs are to be, and it must point out failure to push production rapidly enough to make the predicted profit before it is too late. Also, it should be flexible enough to take care of fluctuation in business automatically.

To accomplish this in a shop making one article or several sizes of one article does not require any very elaborate system. The overhead charges may be figured on the wage-rate or on the machine-rate basis, and the results will be accurate. The same thing applies to the manufacture of things like flour, soap, wire, and so on, where the same processes go on continuously. In such cases, the machine-rate method is the most natural and the easiest to use; for any lessening of hours of production is easily reckoned into the result. Only in those branches of manufacture such as the machinery or wood-working lines, where different parts must go through different operations and in different sequences, is a flexible system necessary, and it is in just those lines that it is most profitable to watch production costs. In shops doing such work, it seems to be necessary to secure complete cooperation between the planning department, as representing the shop, and the cost department, as representing the treasury, to the end that the work may be routed through the shop in predetermined channels and that it may be known when and at what cost each operation or group of operations should be completed. Still other types of production require only periodical taking of costs in detail, but require constant supervision of the cost of conducting each department. An example of this is the manufacture of grinding wheels, which are made in almost infinite combinations of diameter, width of face, diameter of hole, shape, grain, grade, and material, as well as bond and many other variable factors. Any attempt to ascertain the cost of each individual item would be so expensive that it would wipe out all the profits, if not more. In such a case, it is sufficient to know that the cost per pound or per dollar of list price is within certain limits for all the wheels going through each department. For that purpose, the distribution of overhead charges is principally to departments; and that method is a matter of careful division and compromise.



# PRODUCTION ORGANIZATION

## (PART 4)

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### DETAILS OF MANAGEMENT

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#### DEPRECIATION

**1. Depreciation Always to Be Considered.**—Probably more business failures can be traced to lack of proper recognition of depreciation than to any one other cause. Many failures attributed to incompetency come from this cause, as do most of those alleged to be from lack of capital or the granting of undue credit.

Depreciation works all the time, even more rapidly when the business is shut down than when it is running full force. It does not show plainly, however. Machinery, especially machine tools, will run and turn out work for many years after other and better machinery has supplanted it on the market. Buildings in some cases are carried on the books at full cost, the assumption being made that the land on which they are built has increased in value more than the buildings have fallen off. Jigs and fixtures sometimes are carried at cost after they have been discarded for newer designs.

The rate of depreciation is influenced by many things. A building may have been different from others built at the same time. It may have been in advance of the times and its depreciation may have been very small for a long time. Or, it may have been to one side of the march of progress and it may be that a large part of its cost should have been

marked off as soon as it was completed. New businesses may develop very rapidly, and it may be necessary, in order to keep up with competition, to discard machinery long before it shows signs of wear; or conditions may necessitate driving of machinery so fast that it wears out much more rapidly than the designer contemplated, and it is only through adverse experience that he learns how strong to make it.

Actual destruction of buildings or machinery, suddenly, by fire or flood can be and usually is covered by insurance, but there is no insurance available against depreciation by wear, use, or by the elements.

**2. Wear and Tear.**—The form of depreciation most commonly recognized is wear and tear, which comes through legitimate use, but is aggravated by the carelessness of employes, and lack of proper and adequate watchmen. This kind of depreciation, however, can in many cases be made good by repair, so that, if repairs are thoroughly well done, it can be omitted from consideration. In the natural course of business, however, repairs are well made up to the point when the machine is on the verge of becoming obsolete, when it is allowed to run down rather rapidly, and finally is sold as scrap. Some few managers, however, have the happy faculty of ordering new machinery just as prices are about to advance and selling the old machines at the top of the second-hand market. Of course, this is not always possible, in fact, the signs of an advance are so uncertain that not every one dares to order new equipment until everybody else is doing the same.

**3. Rust and Decay.**—Despite the best of care and constant repair, certain buildings and equipment do succumb to actual deterioration that cannot be remedied. An office building may have been paneled in the best of woods and with the finest workmanship, and yet after 30 or 40 years of use no renovation can be made that will make it as desirable as a new building. Age produces other deteriorations that cannot be remedied, rubber insulation on wires and cables hardens and cracks, mortar crumbles in the joints of brickwork, piping and boilers pit and rust. This form of deterioration should be

kept distinctly in mind, as no matter how much is spent in repairs, unless there is actual replacement, this loss is inevitable.

**4. Depreciation Due to Progress.** — Besides the depreciation due to decay, there is, as time goes on, another factor of depreciation that cannot be influenced by even the most thorough repairs; this is the passing of usefulness of machinery, buildings, and other equipment, due to advances in methods and invention. It is easily possible for machinery to become so obsolete that, though it operates as well as ever, no one can afford to pay the workmen to run it. In New England there can be found today lathes and planers built on stone beds, that is, of two parallel stones similar to those used to form street curbings, on top of which are slender strips of cast iron on which the table or carriage slides. These machines are curiosities only; they may be used in an emergency, but they are hardly worth supplying with belts. In only less degree other machines are passing in the same way, some of them not until they are worn out, but many long before that time. The wise superintendent sells these machines to other firms long before the point of decidedly diminishing returns is reached. There is nothing unethical about this, as there is a great difference whether a machine is to be used for production or for repair work. In the latter case the percentage of time during which a machine must stand idle, waiting for an emergency to arise, is so great that it does not pay to supply expensive modern and up-to-date machines. The overhead charges that keep going on all the time will outweigh the advantages of quick production while the machine is in use. A notable example of a good machine becoming obsolete for certain work was shown in machine shops which during the early stages of the World War found themselves with contracts for Russian shells, the limits on which were so small that the only practical way to meet them was by grinding instead of turning. When common sense and the necessity of winning the war combined to reduce these limits to reasonable amounts for the other allies, grinding became too expensive and lathes were used entirely, the grinding machines being

set to one side. These machines, however, were very little worn; so their sale to people who had a real use for them was entirely justifiable, regardless of whether it delayed the sale of new machines.

Lack of appreciation of this lessened value caused by progress is responsible for many disagreements among stockholders, and especially in municipal affairs in the dealing with public-service corporations. In the manufacture and distribution of electricity for lighting and power, this difficulty is especially noticeable. The companies appreciate the advances that are being made all the time, and that their equipment is hardly in place before new discoveries and inventions begin to forecast its becoming obsolete. If, however, the companies insist on setting aside a surplus from which new equipment can be bought, the people who are their customers begin to accuse them of profiteering. Such companies do not have so good a chance to unload their old machinery as many other firms, because the newer equipment is in equal demand from every similar concern except those that have not been able to set aside a surplus for that purpose, and who are consequently headed for a receivership. That is, there is nothing in the electric lighting business that corresponds to the repair shop in the machinist business.

**5. Sinking Funds vs. Depreciation.**—To meet all the possibilities of depreciation, it is a common custom to form a sinking fund, from which new machinery, equipment, and so on, may be bought. The method is unquestionably sound; but unfortunately it too often happens that greedy stockholders will vote themselves extra dividends payable out of these funds, instead of using them for the purposes for which they are intended. Then they sell their stock on its upward movement in the market, which is almost certain to follow after each "melon" is cut. Then a new manager is elected to pull the company out of the hole and the old manager, discredited, goes into retirement, through no fault of his, unless it be a misunderstanding of human nature.

Unless the stockholders are thoroughly interested in the

business, and are sufficiently good business men to understand the depreciation of equipment thoroughly, it is better to carry all these burdens under the head of depreciation, to keep up repairs day by day, and to trade off or sell piecemeal any equipment that is in danger of becoming obsolete. The effect in the long run will be very much the same, and there will not be a large sum of relatively idle money to tempt stockholders whose present use for dividends is pressing.

If, however, the plant is being outgrown and it is going to be necessary to move it to a suburb or to some other city, a sinking fund for that purpose is almost necessary; and, then, too, when the fund is large enough for the purpose, the stockholders have the privilege of deciding whether to use it or to allow the plant to remain small and divide the accumulated profits. If the stockholders are inclined to be too greedy, it is sometimes possible to accumulate what amounts to a reserve by building up credit. That is, a firm that is in the habit of carrying a pretty liberal line of loans from banks and has an issue of bonds outstanding, may pay off the bonds with a distinct understanding with the bank in regard to their plans. Then, when the time comes for a move requiring considerable money, it is possible to borrow it without becoming more involved than past experience justifies. This plan has the advantage of not holding up, in every report to the stockholders, the fact that there is a considerable amount of ready money on hand ready for distribution any time the proper (?) members are present at a meeting.

Since the matter of depreciation in its various forms is likely to be the subject of controversy, the custom is becoming common to have inventories taken from time to time by consulting engineers who treat matters more methodically and impartially than can the owners or the manager of a plant. It is, however, of the utmost importance that the people selected for this work be persons of experience, and that they have a thorough understanding, not only of the principles stated here, but of the business itself and its history, so that they may be able to look into the future and judge with a considerable degree of correctness how the business is being affected by the progress

of the times. Of course the safe thing is to make the allowance for depreciation high; but that, with the other cautious things that a manager so inclined may do, may make the firm's bids on work so high that the factory will have to run short time, which may easily prove more disastrous than a too small depreciation charge.

**6. Rates of Depreciation.**—If all machinery and equipment depreciated at the same rate, it would only be necessary to take an inventory and then deduct a set percentage of depreciation each year, or this depreciation might be divided by twelve and the charge made each month. But depreciation does not occur in such an accommodating manner. Some machinery depreciates very rapidly when first installed, and then runs for a long time without growing less useful. Other kinds do not depreciate perceptibly for a long time, but then they go to pieces all at once, like the famous "one-hoss shay." Some kinds of equipment may not become scrap in 50 years, other kinds should be broken up in five. It should not be assumed that depreciation should follow the market for second-hand machinery. That market depends on demand and supply just as much as any other market. There have been times that second-hand machine tools sold for more than the asking price for new, simply because of the promptness of delivery. At such times, however, every one that had machinery of any kind had all the work that he could possibly do, and could not afford to part with old machines until new ones came. Under such circumstances, it would not have been fair to the stockholders to have marked up the inventory to the level of the market prices. The value was there for the moment, but only for that particular moment. On the other hand, it is not right to mark down equipment to the depths of the second-hand machinery market. In ordinary times, second-hand machinery must sell low enough to cover the cost of shipment, supply of belting, setting up, and some repairs, and still be cheap enough to form a substantial inducement for any one to buy. It is more nearly right to value machinery on the basis of its usefulness, and to depreciate belting and



small tools very sharply indeed. As a basis for bank loans, the valuation of machinery and equipment amounts to very little. Bankers are inclined to omit such assets entirely from their consideration and to look only at the quick assets such as bills and accounts receivable. So there is no object in deceiving oneself for the sake of increased credit; because the bankers will only make a larger discount, amounting to practically the whole of any valuation which may be put on machinery and equipment. Survey of the equipment for the purpose of valuation and to determine depreciation does not necessitate a shut-down as does the ordinary inventory. Neither does the appearance of the equipment have a great deal to do with its value. An automobile will sell for a higher price if freshly painted; but machinery does not advance in price for that reason; in fact, a fresh coat of paint may make the purchaser suspicious.

7. For purposes of valuing buildings and equipment, it is customary to make up a table of depreciation rates in the form shown in Table I, which is taken from Kimball's "Principles of Industrial Organization." The values given in the table are based on estimated lives, which would be different in different cases. The values of buildings are especially affected by the introduction of new styles of design and the growth or lack of growth of the community. The future value of a building is also affected by its original design. For example, a brick loft building which is of practically full value for any ordinary business may have a life quite as long as stated in the table, but a building of the open-shed style, with a traveling crane, may sell for full value or for only a small part of that value, according to whether a customer can be found to whose use it is suited. There have been times when, because of unusual conditions, such buildings, which had been considered a total loss, have been sold to be removed and set up elsewhere, at a profit over and above their original cost. The depreciation on gas engines of large size has proved to be much greater than is shown in the table; Diesel engines, however, have proved to be more lasting. In the table, the depre-

ciation allowed is sufficient to bring each type of machine to its scrap value after the end of its assumed life. This depreciation is computed in two ways, one as a percentage of the

**TABLE I**  
**ESTIMATED LIFE AND FACTORS OF DEPRECIATION**

Character of Asset	Probable Life of Asset in Years	Ratio of Scrap Value to Original Value	Percentage on Original Cost	Percentage on Diminishing Value
Brick or steel-frame buildings, easy service.....	40	.10	2.25	5.5
Brick or steel-frame buildings, severe service.....	20	.10	4.5	11
Good wooden buildings, easy service.....	30	.10	3	7.5
Good wooden buildings, severe service.....	15	.10	6	14
Steam engines.....	15 to 30	.10	6 to 3	14 to 7.5
Steam boilers.....	15 to 30	.10	6 to 3	14 to 7.5
Boiler-room feed-pumps.....	20	.05	4.75	14
Engine room instruments and gauges.....	10	.05	9.5	26
Steam piping, valves and fittings.....	10 to 15	.05	9.5 to 6.3	26 to 18
Portable engines and boilers..	10	.05	9.5	26
Gas engines.....	10 to 15	.05	9.5 to 6.3	26 to 18
Turbo-generators.....	20 to 30	.10	4.5 to 3	11 to 7.5
Electric generators.....	20 to 30	.10	4.5 to 3	11 to 7.5
Electric motors.....	20	.10	4.5	11
Storage batteries.....	10	.05	9.5	26
Switchboard and instruments..	15	.05	6.3	18
Heavy machine tools.....	25	.10	3.6	9
Light machine tools.....	15 to 20	.10	6 to 4.5	14 to 11
Shafting, hangers, and pulleys..	20 to 30	.05	4.75 to 3	14 to 9
Belting.....	10 to 25	0	10 to 4.0	

original cost, so that the amount of depreciation written off each year is the same in dollars and cents as any other year; the other, as a percentage on the diminishing value, in which case the amount actually written off each year decreases. The

latter plan taxes the equipment a little more than twice as much the first year as does the first plan, but it calls less and less attention to the need for replacement as years go on. For example, if the shop buys \$1,000 worth of electric motors, at the end of 15 years according to the percentage on original cost method, they will appear on the books as worth \$325, with a prospective depreciation of \$45 for the next year; while by the percentage on a diminishing value method they will appear as worth about \$170, with the prospect of decreasing only \$19 in the next year. The natural result is to make the superintendent feel less and less inclined to sell them under the latter plan, while really he should have some incentive to get rid of them before their usefulness is too far gone.

8. Every shop has a great deal of money tied up in small tools, patterns, and things that are bought to be used up rather than as a part of capital. Unless there is strong pressure to do otherwise, it is better to treat the cost of these articles as a part of the running expense and charge them up to overhead. Some shops carry on their inventory a nominal sum to represent what they feel sure these things would bring under forced sale, and then buy whatever is needed as it is needed and charge it all to expense. This is likely the most satisfactory method, as these tools have some value, but it is a large undertaking to value each of them separately.

Drawings and patterns are expensive, but if they are carried on the books at anywhere near their cost they form a constant drawback to changes and improvements. More than that, they are practically a complete loss as made. Even the designers who made them would usually like to go over their work immediately and revise and improve it. Such work is never completed and seldom, if ever, entirely correct. Moreover, it is a means to an end. A good way to handle the matter of drawings and patterns is to do the same as with small tools and carry them on the books at a nominal sum, and charge all current expense connected with them directly into the overhead account, or, better yet, in some cases directly into the cost of the machine for which they are used. This latter

plan, however, is only for machines in which the one first built, or the lot first built, is expected to be the last. For example, a manufacturer of planers may build a lot of connecting-rod planers for a locomotive shop, in which case he may very well charge all the drawings and patterns made specially for the job or the alterations from the old machine, to that one lot. In this case he is safe, and while for a future similar job he should not give a competing railroad the benefit of the work he has done for another, he will very likely find that the next order will require many changes that will have to be charged into the cost of that lot. If, however, the article were one to be manufactured for the general market without change, the cost of the drawings and patterns might be distributed over a longer time.

**9.** Another kind of assets that require attention are those like mines, quarries, and so on. Here the value of the property is always problematic. The indications, so far as visible, may point to an unlimited supply of the finest marble, and yet advance of a few feet on the work may show unmistakable deterioration in quality or it may show the limits of the deposit. It is necessary to capitalize such assets, however. They are bought on the strength of estimates the truth of which cannot be verified until the deposit runs out. There is no knowing whether a deposit that has been estimated to allow for 20 years' use may not run out in five. It is therefore safer, when possible, to charge up depreciation or usage against such property very rapidly until the total cost is wiped from the books.

**10. Handling Depreciation Charges on the Books.** It should always be borne in mind that none of the charges for depreciation alter the condition of the company in any way. It is not possible to make a profit by decreasing depreciation rates. Nor is it possible to lose money by charging too much. These charges make a great difference in the showing on the books, and they have an effect on the prospective purchaser of business or of the stock. However, if the purpose of the books is to show the true condition of the

business, then it behooves the management to pay very careful attention to the actual depreciation going on, which means something more than a perfunctory decrease of 5, 10, or 15 per cent. on all assets.

It seems wise to have a new inventory made every year, or at least every other year, by some outside and entirely disinterested people. Between whiles, the depreciation shown between the two previous valuations may be safely prorated for monthly charges against departments. The great temptation to cover up losses in bad years by omitting depreciation altogether, or by making it less than usual, is simply an attempt at self-deceit, and should not be allowed. As a matter of fact, the depreciation of almost any plant is greatest during time of depression. That is the time when actual loss of value is the greatest and depreciation should be the most. No rules can be laid down that can be followed by a clerk. Depreciation is a matter for an engineer who is familiar with the business. It is not merely a matter of entries in books, but is a vital part of the business, and the depreciation records should call attention to the time when old machinery should be replaced, rather than leave the matter to chance.

A good plan is to have an index with a card for each machine worthy of inventory, and on this card to enter the first cost of the machine, including all items of expense up to its installation and the beginning of production. Then can be entered, once for all, the depreciation that is to be taken off at each annual inventory. Space may be provided so that any repairs that may be paid for may be offset against the depreciation, though it seems in many cases wiser to make the rate of depreciation cover all other items except those that can be covered by repairs, and then have the repairs made in the ordinary course of business and absorbed in the general overhead charges.

## GRAPHIC PRODUCTION CONTROL

**11. Purpose and Method of Graphic Representation.**—In connection with the work of the planning department, and as a means of visualizing the progress of work, a number of plans have been used to make the progress of work evident to the eye. In principle, these are all alike; but many minor variations have been made or proposed and undoubtedly many more will be.

The underlying principle is that of representing by a line of suitable length the time which it is expected it will take to complete each unit of the work, and then, day by day, if possible, showing on each such line what proportion of the work has been done. This plan requires a board or chart on which there is a line for every operation on every piece, and this line is blacked over, or colored, or covered with a colored ribbon as fast as the work is done. If only a single operation is to be done on each piece the lines may be parallel and of the same length. In that case, if each lot comprises 100 pieces, then the number of pieces completed is the percentage completed. For any other number than 100, the percentage completed would be computed, which may be done on the slide rule or by means of a chart showing percentage by proportion.

The method just described is simple, effective, and useful, for it shows any foreman and any workman whether he is keeping up to schedule or not. It is human nature for every man to work better if he has something to aim at, a definite something he can try to do. This is true whether the mark is the bull's-eye of a target, a school record for a mile run, a shop record, or the number of bricks that can be laid in an hour.

But even this simple means of showing progress is not at all likely to find favor with the organizers of labor. In the first place, it is hard work to make a man who is running a race feel downtrodden because the prize for which he is competing is not to his liking. Even professional athletes find it very hard work deliberately to throw a race once they have



started in it. Men may not be willing to start in a race until the prize for which they compete is set up and acceptable to them, but once started there is no holding them back. Merely putting before a gang in the shop the fact that they are ahead or behind another similar gang is enough to yank the loiterers out of their pace and set them all at work.

No one wants to run a team race unless he is convinced that the team has a chance of winning and that the other men will do their best and not leave it all to him. The use of a graphic production record sets up a race from the very start, even if the chart is on exhibition only to the foremen. If the record is shown to the workmen and understood by them, it brings the race nearer to them and saves in the supervision required. If this method of exhibiting progress is accompanied by a method of payment that increases the reward in proportion to the exertion put forth, and if at the same time there are ample non-financial rewards, there remains only the one fear, which is that some men may overexert themselves. There is, however, a possibility that, if every one began using all these methods, the profits would be so large and the output so great that some would begin to feel the need of cutting prices of product and in turn cutting prices of labor. This in itself would be fatal to the success of the plan, for the very essence of success with piece work or any of the premium and bonus systems is that rates shall not be cut, least of all on account of successful performance. It is likely that in the use of these plans there lies something which will make the organization of labor merely social and which will render it harmless and unnecessary.

**12.** When a man is breaking a record, or coming close to it, he deserves the best that the company can offer in the way of making his work easy, and not only does he deserve it but it is a very good investment for the company to give it to him. If, then, piece rates are set scientifically, as has previously been suggested, if a suitable allowance of time is made by the planning department so that the workman has that length of time on which the piece rate was based to do the

work in, and if he has his tools, drawings, gauges, and everything that he needs to do with brought to him, together with the proper and necessary stock, if he is taught the best way of going at the job and his work is promptly inspected so that he cannot go wrong for more than a few minutes, and if on top of all this he is paid extra money for production in excess of the normal amount set by the planning department, then he will not require any welfare plans to induce him to produce the most that is in him; he will only want a fair field and no favor, with working conditions such as his superintendent would want if the two changed places. Given all these things, and unions can have little influence counter to the shop. And the shop will not have much to criticize in its men. It will attract men who can do the work so as to make a large profit. However, the way to show the workmen how they are getting along is through their eyesight. In that respect they are very much like the president of the company. In fact there are very few men who will not spend a great deal more time studying a chart, drawn in plain terms, than they will in perusing columns of figures, and they will get much more from the chart.

**13. Graphic Control of Varied Operations.**—In many cases, a number of operations are required to complete a part; and if even one of these operations is neglected, the parts are useless to the assemblers, their work will stand still, and the delivery of the finished machine or product will be delayed. To insure that no operations shall be overlooked and that the various operations shall be completed at the proper time, a chart similar in form to those shown in Fig. 1 (*a*) or (*b*) would be used. These charts represent two methods of charting the work to be done on Part 417G, and show when each operation is to be completed.

Either form shown may be drawn to a large scale and posted where all interested can see it. The form shown in (*a*) takes up less room on the chart, but the form in (*b*) might be more easily understood by many persons. If all the parts are put through one operation before any are sent to the next,

the form shown in (a) is very good, because a ribbon wound on a spring reel, like a tape measure, can be set up at the end of each line and pulled out to correspond to the progress of the parts. The same thing can of course be done when the form shown in (b) is used, but a spring tape would be required at each line. The same result is obtained by using colored crayons with which to block out the lines to represent the progress made. This use of crayons is especially convenient for indicating the proportion of each of the various operations

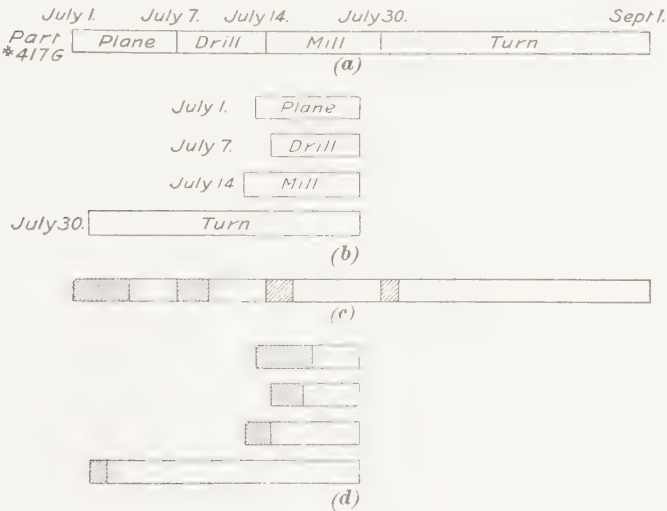


FIG. 1

that is completed when work is being rushed through. For example, as soon as some of the parts 417G begin to come from the planers, they may be rushed to the drills without waiting for the whole lot to be planed; so also on the next step some of the parts may be started on the milling machine before all the parts have been drilled. If work is rushed in this way, a chart originally laid out as shown in (a) may, on July 6, have been marked so that it will appear as shown in (c). This chart might not be readily understood by all workmen. If, however, a chart like that shown in (b) were used, and marked to represent the same progress as that shown

in (c), its appearance would be like that shown in (d) and might be more easily understood.

Of course, if the charts are for the use of the planning department only, there is no need of anything but the single line as in (a), for each part, and the chart may be very small so that it can be kept on a moderate-size drawing board; but if the psychological effect on the workmen is desired, it will have to be large enough and so located that it may be seen by any one that has the curiosity to look. It may seem that some men spend a great deal of time looking at it, but once they get its full significance there is bound to be a great inspiration to accomplish things, if the other conditions mentioned in the preceding article are favorable. Of course, there will be those that see in any plan of this kind only some sort of a scheme that the management is trying to put over to the detriment of its employes. Some may jeer but stay to fall in line or they may in a few instances fall out altogether; the others may simply fall in line and be surprised at the amount in their pay envelopes or they may sink out of sight and gradually disappear. It is certain that this plan of organization gives every one an opportunity to make money for himself and does not offer the company any opportunity for exploitation that is not offered by any other system. Moreover, it puts a premium on fair play by the employer, which none of the other methods of management do, in that it assures the company of the opportunity for a substantial decrease in overhead charges as compared with the direct pay-roll system. Workmen who are busy on account of their own interests require less supervision, and when they turn out the added work that they can, due to the fact that they have the materials, etc. at hand instead of having to hunt for them, the overhead becomes a much less percentage of the larger output.

## WHOLESALE AND RETAIL MANUFACTURE

**14. Operating Two Methods Together.**—Certain products are made by continuous methods of manufacture and require for distribution only that they be divided into certain quantities and shipped. To this class belong textiles, shoes, wire, bar steel, and similar goods. But even these goods have, for certain purposes, their special variations, for which a larger price is willingly paid and from which a profit may be derived. A textile mill may have its looms working steadily on a certain fabric; but if the need arises for another pattern, even though it is only for a few yards, there is almost always a price at which it will be profitable to stop a loom, make the required goods, and start it up again. Or a mill may get a reputation for doing these odds and ends and keep a few looms running on short jobs so that it can readily take more.

There are many concerns that take the position that they are wholesale manufacturers only and that they will not take odd jobs, no matter how closely these may be related to their regular line. Nevertheless, many others find it imperative that they complete a customer's order so far as it relates to their manufactures, instead of trying to have him split it between themselves and a competitor.

There are two ways of meeting this emergency, one by having two shops, one a jobbing shop, the other a wholesale shop. The other method is to handle the two in parallel, letting the same organization do both, and filling the short jobs in between the long ones. The separate jobbing shop is used by some of the large wire manufacturers, who, in some parts of the country, devote entire plants, employing many thousands of men, to the filling of small orders for specialties. These plants are located where the most highly skilled men are to be obtained, men who ask and get the top wages. Their other plants, the wholesale shops, are at a distance, their employment departments hire a lower grade of men for all but the leading places, and they turn out the work rapidly and as well as the market demands; but the best work is in the jobbing shop.

**15.** The method by which wholesale and retail work is carried on in the same shop seems to be better adapted to the machine-tool business, or to the manufacture of things like grinding wheels, where a customer is amply justified in saying that his work is "different" and requesting special wheels. If a customer orders thousands of wheels of a standard size and specification, it is impossible to refuse him a single wheel to meet some special need, and of which he may use the one for a year or more before it is worn out. A manufacturer of lathes also has the problem of being able at the shortest possible notice to turn out, not only lathes of a given swing and ordinary length of bed, but he must be able to deliver longer and shorter lathes with the minimum delay. In these two cases, the only logical method is to handle the wholesale and the retail business in the same shop, and in parallel.

**16.** The planning methods and cost keeping for the separate jobbing shop are obviously to be arranged for such a shop, and need only a careful study of the work, and adaptation to its special needs. Where, however, the work is carried along in parallel, an especially keen and active planning department is required. In fact, without a planning department such a shop is totally lost, unless it has one of those super-human superintendents that can keep a thousand and one things clear in his mind at once. The planning department needs to be thoroughly in touch with the sales department when this retail business is to be handled, for it must get the spirit of the sales department, else it cannot see the inevitable loss which these little orders cause without wincing and being constantly tempted to sidetrack little orders for big ones.

**17.** It is reasonable to assume that any shop in which the orders average as much as a thousand dollars each is likely to lose money on a five-dollar order that has to be made up and shipped separately. In fact, if the cost of the planning department is charged directly to the jobs on which work is done, which it should not be, then it is doubtful if a five-



dollar order can be followed through the shop for as little as that amount, and thus the entire shop cost is left as a loss.

Of course there are salesmen who will encourage a customer to order a single article and experiment with it, when they might secure an order of reasonable size for something that they know to be adaptable to the customer's work. However, the sales department should be the judge of the advisability of accepting the small orders. They may have especially good reasons. The order may be experimental and have good prospects of success. It may be experimental and be almost sure to fail. If the latter, it may be that there is no other way to convince the customer that he is wrong except to let him try it himself. It may be that the customer is a little shop which cannot afford to buy more than a single thing, where its competitors have been buying in carload lots. There has been a great deal of money lost trying to make big customers out of little ones, but most of it has been lost by inducing them to overbuy rather than by selling them their necessities at a little loss and helping them to build up their own line.

**18.** Once the retail order is in the shop and marked *Rush*, as most of them are, it should have as much of the right of way as is possible with due regard to the company's obligations to larger consumers. It is seldom necessary to stop a running job and put in the short job. In a printing establishment running on large orders of calendars for New Year's, for example, it should not be necessary to shut down a press, start it up for a short job, and then start it up again for the running job. The work going through the shop should be so timed that there will be a press completing a job as nearly every day as possible. Then a short job can be sandwiched in between two large jobs without any greater expense than comes from doing small orders in any case; and it is to be expected that the sales department has attended to that, either by making the price such as to make a profit, or else by charging up the extra cost to advertising or to investment in the future profits to be made from the small customer.

This process of putting a special order through the shop together with large orders is very like a small boy wriggling his way through a crowd. He does not know which way he will turn until he comes to the chance to duck under one man's arm, to go to the left of another man, and to the right of the next. In the same way, it seems impossible for the planning department to lay out these little jobs in any very scientific way until the job reaches the department in which work is to be done. In a measure, this does not seem to be following out the scientific basis on which work is normally routed by the planning department. However, the practice may be justified, since the profits of the company come directly from the large stock orders, and these small orders are likely to be productive of stock orders in the future.

**19.** Another phase of the retail manufacture is encountered when it is desired to take a portion of a lot that is coming through in regular order and push it through for early completion. If the planning department has arranged to have everything for the whole lot come to the assembly floor at the time it is wanted, or with only enough leeway to insure that accidents will not delay final completion, then pushing a part of a lot ahead means a doubling of routings, which is difficult and usually results in the rush work taking about the time that was planned for the whole job, and the rest of the order being much delayed. If, however, it is expected from past experience that it may be necessary to split orders for the sake of filling emergency demands, then it is wise to carry in stock, or at least to provide in advance of the larger and more expensive parts of the machines, those parts on which the labor expense is large in proportion to cost of material or storage space. If this is done, so that many small parts can be taken from stock in advance of the expected date of completion of the whole lot, then the rushing of one part of an order ahead of the rest becomes a matter of a new routing for only the larger parts, which require relatively less labor than the small parts that have already been put in stock.

The cost of manufacture of these smaller parts has probably

yielded to the efforts of the efficiency department, and the labor cost is probably much decreased by making them in large lots. Many of the smaller parts may be screw-machine products or they are made in jigs and fixtures on milling machines and drills, without the need of fitting each to its place. As a result, the cost of carrying these small parts in stock is not large. In fact, since only large shops can afford to have enough machines to carry on the manufacture of all kinds of parts at once, it will be necessary in any case, for the sake of economy, to make the small parts in lots that are multiples of those in each manufacturing lot, and to maintain an adequate supply in stock at all times. For example, suppose that automobiles are being built on a rather large scale. It may be that a lot of 100 is the normal unit into which each shop order is cut. It might then be wise to make many small parts in lots of 500, 1,000, and in the case of screw-machine products possibly many more, if the labor is a large part of the total cost when they are made in small quantities. It should be noted, however, that there comes a time when the apparent advantages of production in large quantities is only imaginary. When tools require resetting, and the machine readjusting, and when the interest and storage charges on the product become a considerable factor, it is best to consider whether these expenses may not altogether outweigh the advantages gained by producing in large lots.

**20. Continuous Production.**—In continuous production, a machine is assigned a certain job and kept on it indefinitely. When there are repairs to be made, the machine is shut down, and production of the article made by that particular machine stops unless a battery of similar machines is working.

Continuous production can be arranged and set going very much as we build a clock, wind it up, and set it going, with the exception that there is the human element to deal with. The human element shows itself in the high turnover of labor, the unrest which comes with monotonous work, and the tendency of the people in the higher offices of the company to

invent new things and to broaden out into them. Very few single-purpose products have stayed such for many years at a time. The dollar watch and the Ford car are two notable examples of long life with a single purpose. Both, however, show signs of breaking out into general manufacture; the dollar watch now sells at from \$2 to \$6 according to the style and finish, and the Ford car has gone over into tractors and journalism. We are an inventive and many-sided people and we cannot long restrain ourselves from showing it.

Successful continuous production has been found to depend on the ability of the management to reduce the work to operations that can be performed by people who are neither inventive nor many-sided. The work has to be done by emigrants from those European countries where the people have been subject so long that they do not expect anything different. Otherwise the workers will shortly tire of the monotony of the job, and will find other places to work. This cause does not, however, show on the analyses of labor turnover by the employment department. It is very seldom that men say that they are leaving a job because it is too monotonous. Sometimes they will say that the work gets on their nerves, but more often they stick to the work until they get a job which they think they will like better, and then say that they have found a better job; from which the employment department infers that they mean that they are to get more money.

For these reasons, it is virtually impossible to fill a continuous-production shop with the class of employes that can get the most out of the equipment. Therefore, manufacturers have given up trying to get a high quality of men for such work, and have set a low wage rate for the kind of help that will stay an appreciable length of time.

These men are necessarily of low mental age and are correspondingly slow mentally. They learn to do their own particular job very well, however, and with what passes for celerity compared with the awkward way a green or inexperienced man would do it. They are very likely to come from races that respond rather readily to Bolshevik influences. We are apt to condemn them for this, when really we should

condemn ourselves for not offsetting the propaganda which the Reds are spreading, by good sound advice written in language which the employes can understand. It is no more than to be expected that they will see only the side of things that is brought to their attention. For this reason, production in mass should not be undertaken without some definite attempt to rotate men from one job to another at intervals, or else it should be accompanied with a very persistent and clear-cut attempt at Americanization, not merely teaching "English for foreigners" but teaching them our ways and our moral standards and our standards of living.

**21.** The planning department of a single-purpose factory should be kept, if anything, slightly undermanned, as otherwise it will have time to invent new routings and better ones, while the greatest profit from such work lies usually in a policy closely adhered to, even though it may not be the best. So it is usually wise to give the routing of work a thorough study once for all, try out the routing planned and make whatever changes a short experience indicates, and then settle down to that as a routine, resisting any thoughts which may occur in regard to changes even though they may seem to show the possibility of a considerable profit.

Costs in such a factory need hardly be followed with the persistence necessary in shops making a variety of goods. If the product is turned out within the standard time set by the planning department, the cost is pretty well known from past experience by taking into account any changes in the wage rates or cost of material which may have taken place. The moment any part of the work slows down, the fact is very noticeable and does not need the services of a cost department to point it out. Occasionally, however, the actual cost in each department should be taken for a time and studied and compared with previous costs.

## REPAIRS AND UPKEEP

**22. Who Shall Make Repairs?**—As soon as a shop outgrows its first environment, the question of who shall make repairs begins to make itself prominent. When the factory has reached the continuous-production size, there is only one answer, that is, to have a repair department and let no one else make any repairs. Between the two stages, there is a great deal of room for argument, and the decision in each particular case is not to be found by the use of a slide rule or rule of thumb.

Shops that employ highly skilled men for practically all of their productive work cannot refuse such men the privilege of making their own repairs and adjustments. It is cheaper to have them make them than to have the repair gang, because the repair gang could not do the work so well nor so quickly. However, as soon as operatives who are not skilled mechanics begin to come into the shop, so must the repair gang. Now the company is making the most money when the repair men have no work and the least when they are working the hardest. Yet the repair men know that it is only human nature for them to be dropped from the pay roll unless there is work enough to keep them busy. For this reason, it is wise to have a combination of repair gang and "flying squadron" of all-around workmen who can step into any department at a moment's notice to take the place of men who are out temporarily. In that way, the men who are called on for repair work are stable members of the organization.

Some shops go so far as to deny all their production men the privilege of making any repairs or adjustments on their machines, and prefer to have a man stand entirely idle, or if some one else is absent, to take another machine for the time, while the repair gang is working on his. This is carried so far as to put all belts under the care of a belt expert; and, while it is not often that the elaborate care is given them that was proposed by Taylor, there is a great deal more systematic care of belts, if they are all taken up and laced, or otherwise joined, by one set of men who go into all departments of the



shop for that purpose. In any shop where belt repairing is haphazard, there is every variation, from belts slipping so that the workman can hardly take a cut light enough to keep the machine going, to those where the belt is so tight that it is pulling its fastenings out and being ruined.

**23.** The one thing that is most used as an argument against a repair gang that takes over all repairs, is the fact that it so many times results in having the machine operator standing by entirely idle. The loss due to his idleness is visible, and his wage rate is usually pretty well known to the management, while the loss due to the lack of the use of the machine is not so well known. Since the overhead charges in almost every shop exceed the wages paid for direct labor, it really is more expensive for the machine to stand idle than for the man. If the repair gang can get the machine back into commission and running at full rate in half the time that the man could, it surely pays to have the gang do it and let the operator stand idle. The question is thus purely a mathematical one, if the relative abilities of the average operator and the repair gang are known. Too often, however, the repair gang does not exert itself to complete the repairs as quickly as possible and with regard to keeping production as continuous as possible.

The great difficulty is that there is no basis of comparison for most repair jobs. Occasionally there is a standardized repair job that can be put on a piece rate. Such a case is usually merely the replacement of a part that normally wears out regularly. Any other job, no matter how well estimated, is almost certain to develop unexpected complications, some of which may be imaginary and might not complicate the work if the repair gang were provided for and knew that their jobs were safe even if the repairs became small in amount. Something is needed that will compare with the Chinese method of paying a doctor a fee for the time his patients are well and penalizing him for the time they are sick. The only solution that has so far been found dependable is to employ only men of high grade, pay them well, and give them constant and

intelligent supervision. Some men are adapted by nature for emergency work and are not happy unless they have it. The more urgent the need for their work, the happier they are. Every job that taxes their ingenuity is an adventure and a happy one for them, no matter how disagreeable and dirty it is and no matter if they have to stay up all night to do it. Such men are, however, restive under a time clock. They want to work hard, wear themselves all out, and then have a chance to recuperate. The shop that can build up a gang of that kind of men, and is wise enough not to hold them to exact hours, and that rewards rush work by relief from restraint, is fortunate.

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## EMPLOYMENT PROBLEMS

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### PRODUCTION BY OVERTIME

**24. Night Work.**—As was noted under the head of Distribution of Overhead Charges in a preceding Section, the charge per productive hour is much less if the hours are many than if they are few. That is, there are so many charges that go on even when the shop is shut down, and so many others that do not increase in direct proportion to the hours worked, that there is always the inducement to consider the use of overtime or the employment of two or even three shifts of workmen. Nearly every one that tries night work, and especially a night shift, is desirous of dropping it after a rather short time, but usually because of personal choice rather than because of a question of economics.

Workmen do not like night work except for the money that it brings them in excess of that which they might otherwise earn. If two gangs are employed, and one gang is kept continually on night work and the other on day work, no power can prevent the best men gradually filtering into the day gang. The night gang is blamed for everything that goes wrong, it is least supervised, and has the greatest opportunity to spoil work without being caught. Moreover, no one really expects much of the night gang. If the matter is studied

from the point of view of the profit made, however, it is seen that it is economically possible to pay the night gang more money and ask less returns, and yet add to the company's profit.

For example, assume a shop to have a day pay roll of \$1,000,000 per year, overhead expenses of \$2,000,000, and a production of \$3,000,000 above the cost of material. Then there would be no profit. If a night gang is put on at 10 per cent. higher rates than the day pay, with additional overhead charges equal to 50 per cent. of the former overhead, the cost of two shifts would be

Day pay roll .....	\$1,000,000
Day overhead .....	2,000,000
Night pay roll .....	1,100,000
Night overhead .....	1,000,000
Total cost except materials.....	\$5,100,000

If it is assumed that the night gang produces 10 per cent. less than the day gang, their production would be \$2,700,000, and the total production would be

Production of day gang.....	\$3,000,000
Production of night gang.....	2,700,000
Total production .....	\$5,700,000
Total cost .....	5,100,000
Profit .....	\$ 600,000

Thus there would be a profit of \$600,000 where there was no profit before. Also, as a usual thing, a 50 per cent. increase in overhead charges for a night gang is unlikely, though there is almost inevitably an appreciable increase in the amount of spoiled work, and it is necessary to be even more careful about safety devices and safe practices than with the day gang alone.

Moreover, the employment of a night gang enables a small concern to nearly double its product and to more than double its profits, without adding greatly to its fixed capital. In fact, since most manufacturers depend on their banks for carrying

a large part of their working capital, the increase is not so much in actual capital supplied as in interest paid out.

**25.** Whatever advantages there are in a second, or night, gang in a shop apply to a third gang, provided that the efficiency of that gang is not too small, and provided that it is not necessary to pay too much to them as compensation for working at the most disagreeable hours of the twenty-four. In fact, the question of the third gang usually hinges on the possibility of creating it. As an ideal, it seems as though the 24 hours were made to be divided into three parts, one for work, one for sleep, and one for recreation and private life. However, when the 24 hours are divided into the three shifts, it is inevitable that at least one of the shifts must work at a time usually thought of as fit only for sleep or nefarious deeds. More than that, the division of the day into 8-hour shifts implies that each shift will work the 8 hours without rest periods and without food except as it may be bolted while working. With certain jobs that are of the watchman type, this is perfectly possible. Firemen, machine tenders, and workers of that type work but a small part of the time they are on duty, if the word work is used in its literal sense. They have abundant time to eat pretty nearly whenever they choose. But almost every skilled and even unskilled workman has not only to be present and ready to work, but he has to work with his hands and brain, neither of which can he do and eat at the same time with any satisfaction to his stomach.

**26.** When three shifts are worked, they are usually made to run as follows:

Shift <i>a</i> .....	7 A. M. to 3 P. M.
Shift <i>b</i> .....	3 P. M. to 11 P. M.
Shift <i>c</i> .....	11 P. M. to 7 A. M.

Shift *a* is the most desirable, attracts the best men, and is the most productive. The only hardship it works is in the case of men living at a distance from the shop where trolley cars or trains do not make suitable connections. Where the 8-hour day is prevalent, most shops open at 8 A. M. and trains

are regulated accordingly, so that the shops that open at 7 are handicapped. From most men's points of view this shift is especially desirable, because it gives them a large part of the afternoon for recreation, gardening, and so on, without necessitating their shortening their evening by going to bed early.

Shift *b* is not so desirable, because it upsets the whole plan of the employee's life and he soon finds that he is working solely for the money for his family to spend, with very little chance to get any immediate benefit from it. If a man is single and has some definite object in saving all the money he can for a short period of time, this shift is an excellent one, because he has so little opportunity to spend his earnings. His hours will probably be about as follows: To bed at midnight (if he is in New York he can take in a moving picture, but hardly anywhere else), rise at 8 A. M., loaf around the house until 2 P. M., and then start for work. He can garden during the morning if he wishes, but his employer will lose out if he does, because he will put his best energies into that rather than into his shop work. He will breakfast at about 8:30 A. M., dine at 1:30 P. M., and eat his supper on the job about all night.

Shift *c* is still more of a departure from the usual. The working hours are those when it is hardest to keep awake at all, let alone try to work. The man's daily routine is likely to be: Go to bed at 8 A. M., rise at 4 P. M., putter around the house until the ordinary supper time, go to the movies, a dance, or some other recreation, and from there directly to work. In this case the man can have breakfast with the rest of the family, but he is asleep while they are lunching, and has to have his lunch before they are ready for dinner. He also eats all the time he is at work. When he goes to work, he finds trolley cars running in the neighborhood of large cities, but if he lives in the country he may just miss the last car. The worst thing about this program, from the employer's point of view, is that in his daily routine the workman plays just before he works. From the man's point of view, it is expensive, because he can so readily take in dances and theatricals.

Probably the happiest solution of the extra-shift problem is that found in shops where such processes as can be done by rather low-grade men, whose work is that of being present rather than doing skilled work, are put on the three-shift plan and where the highly skilled work is kept on the single shift, except in case of rush of work, when the two-shift plan is used. Usually, it does not pay to run overtime with one shift if the working time exceeds 10 hours, except in the case of the watchman type of work. The 8-hour day has a great deal of fascination for workmen, especially if the shop runs 10 hours and they get time and a half for the overtime, thus getting the apparent bargain of an hour's pay for nothing.

**27.** A drawback to the two- or three-shift plan is found in the attitude of foremen, timekeepers, and other men of high mental grade who are necessary to the success of either plan. They very naturally object vehemently to taking either of the disagreeable shifts, and they ask much more pay for taking them or, what is worse, accept them with the mental reservation that they will take the first "good" job that they can find. Labor turnover among such men is inevitably much greater than among the same class of men in the day shift. However, it is possible to pay them money enough to make life worth living in many cases and still derive a very considerable added profit from the extra gangs.

In a previous Section, the expedient of shifting gangs every week or two weeks has been considered from the point of view of the employe, but it is equally inexpedient from the employer's standpoint. It is not to be expected that men can do a full day's work unless they have had a full night's rest, no matter how good their intentions may be. They cannot get a full night's rest merely by being in bed; they must sleep, and that is something that many men cannot do in the daytime without considerable practice. If there is a constant changing of shifts, men never become accustomed to the changes at all, and consequently they come to work sleepy, disgusted with life, and in a mood to listen to any Bolshevik propaganda that may be floating through the air.



**EMPLOYMENT OF WOMEN AND CHILDREN**

**28. Conditions to Be Considered.**—From the employer's point of view, the advent of women in his shop is desirable if there is a lack of men to fill the places or if the women will work for less money than men. However, the cry now is, "Equal wages for equal work," which appears to be entirely reasonable but not always carried out, since women do not always contribute equal work even though they occupy the same places. A perfect method of rewarding men for their work should be equally applicable to women and should entirely solve this problem. In fact, any system of payment that recognizes the decrease in overhead charges, per unit of either work or men, which comes from rapid production, will be equally applicable to either men, women, or children, provided the women or children do not require more portorage or other contributory work to be done on their account.

It is, of course, to be recognized that women are not physically adapted to do work which some men can do with impunity. The same is true in increased degree of children of both sexes. Women often make claim to physical equality, but the very fact that in athletics they never reach the same marks as men indicates otherwise, as there they have no restrictions other than physical to contend with. For this reason many states have passed legislation that restricts the hours that women and children shall be allowed to work, and in some instances have restricted them so that they shall not work after ten o'clock at night, which makes them unavailable for the second and third shifts if such are used. These restrictive laws have not been passed with any knowledge of just how women themselves would have voted on them if they had had the opportunity. What will be the result in the future is not known, but it is evident that not all women feel the need of legislation that prevents their doing whatever work they themselves think best. They cannot see any reason, except the paternal one, why men should presume to tell them when, where, and how they shall work. It is probable that they are quite right, and that it is true that all these laws have been

passed with the desire to protect women against themselves rather than, as has been so often said, to protect them from their employers.

Whatever may come from future legislation, experience has proved that women can be found who will gladly do a great deal of the work that has formerly been considered men's work. Not only can they do it, but in some instances they can do it much better and faster than men. Every woman has her own individuality, so that generalities always find many exceptions, but usually it is found that women can do work that is of the same general nature as that which they have done for centuries better than they can do work that imitates that which men have done. For example, women do fine work requiring close attention, like the manufacture of electric meters and other measuring instruments. They make very much better inspectors on small work than men do, because they much more readily concentrate on it. They do not, as a rule, learn to do mechanical things, except in an imitative way; that is, they do not reason them out and rise to emergencies if necessary. They are not likely to learn to adjust machinery. Putting a new needle or a shuttle into a sewing machine is about the limit for many. There are of course enough exceptions to this rule to prove it, but in general it is not safe to expect them.

**29.** If a shop is what it really should be for the most efficient working, there should be no additional expense to putting women on the job, beyond that of partitioning off an appropriate number of toilets for their use. If the shop is filthy, it will be found necessary to make it clean before women of a desirable class will stay in it. If the machinery is not properly safeguarded, it will be necessary to attend to that. If the toilets are not fit for women, they are not for men, but men are not apt to say anything about the condition of toilets and they do not make their condition the major reason for leaving any one shop. It may be a contributory one, and it may be the last straw that determines whether the man will stay or go. In the case of a woman, it is very likely to be the reason why she goes and goes promptly. However, every-

thing that women workers insist on is profitable to install for men workers, if the firm has the capital available to do it.

**30. Training of Women Workers.**—Most men will at least pretend some acquaintance with the work they are asked to do. Sometimes it is only a pretense, but in general they know something of it, at least from observation. Women are very likely to apply for work when they are utterly unfamiliar with shop conditions, to say nothing of the specific trade which they expect to practice. In fact, often they cannot make an intelligent choice because they are so lacking in information. Inasmuch as the great majority of women work purely for the money that they can get and not with the idea that they are going to make it a career, it does not make so very much difference what they take up, so long as they are mentally and physically adapted to it. For these reasons, the type of training that was known during the World War as the *vestibule school* is peculiarly adapted for training of women, even though it was instituted only as a war-time measure.

The vestibule school, as indicated by its name, is a means of entry into the shop. Instead of hiring men or women and putting them directly into the shop, to sink or swim as they may, they are first placed in a separate room in which are the typical machines of the shop and an instructor whose duty it is to teach a specific job to each new comer. Inasmuch as nearly all work into which women are introduced is in the nature of a single operation, or at most a group of very simple ones, it is easy to do this. No attempt is made to teach the reason why, the things which have led up to the job in hand, or to do anything except to teach the girl to do the thing the way the instructor tells and shows her. She stays in this room until she does her work with confidence in herself, and until she gets accustomed to the noise of machinery. These rooms are usually built in the shop itself, and consist only of a partition high enough to shut out other and curious people. This latter is necessary only until the shop has enough capable women workers so that they do not feel timid in the presence of the more skilled workers. After that, the walls can be

taken down and chalk marks on the floor substituted. However, as long as girls keep coming in who are entirely unfamiliar with the work, it is profitable to give them pretty specific training, if for no other reason than to teach them how to do the work in a way that is productive of results without being too tiring to them, and also to teach them how to accomplish the most possible with the least physical exertion. Left to themselves, they are likely to copy the most awkward girl in the room, and more than likely to acquire ideas of limitation of output that only reduce their own income without raising that of others. During the training period, it is probably best to pay day wages so that the girl will feel that she can give her attention to learning rather than earning. The length of time that a worker should stay in the vestibule school is also very indeterminate.

There is a great difference in the mental aptitudes of different persons who are equally able to do a given job. In fact oftentimes people of high intellectuality find it very difficult to acquire a physical knack and require much more practice before they can be put on piece work than do those who have neither education nor the ability to acquire it. The fact that one girl acquires the "tricks of the trade" quickly and another slowly does not tell which will be able to earn the most money at the end of 5 years. The quick learner may be superficial, and may be one of those that finds every place she works so slow that she can only stay long enough to collect money enough to take her one more stage of her journey. The slow learner is much more likely to stick to one shop during her entire industrial life.

**31.** Much has been said about the instability of women workers. It is very true that women do not have such long industrial lives as men. Where men work at some industry or other for 20 or 30 years, women only stay 5 to 8 years, before they get married. On the other hand, experience has shown that the average man has something more than one new job each year, while the average woman stays 3 or 4 years in a place. For this reason, it is fully twice as safe

to expend money in the training of women as of men. However, it is futile for a shop to start hiring women, to say nothing of training them, unless it is willing to put the shop in fit condition for them. There are of course notorious exceptions to this rule, but they are only enough to prove the rule. Women whose morals are above reproach will not stay long where the working conditions are not good, and their men folks will prefer to support them in idleness otherwise.

#### UNEMPLOYMENT

### 32. Causes and Remedies of Unemployment.

There are two classes of unemployed, those who do not wish to be employed, and those who need work or think they do. The latter class are most affected by the periodic ups and downs of business in general and by the seasonal fluctuations that are incidental to many kinds of manufacturing.

Seasonal fluctuations occur as a result of demand and supply, as in the case of Christmas goods, skates, snowshoes, and so on; or they may occur through the necessity of doing the work when the material is available, as in the canning industry. Corn, beans, peas, and so on, must be canned immediately after they are picked, as otherwise much of their flavor is lost. In the case of Christmas goods and others of that type, manufacture is carried on over several months' time, but so much of it depends on fashions and fads which are likely to change at any time that manufacturers hardly dare to discount any considerable amount of their prospective orders and borrow the money to carry them. The interest on the necessary money to carry a stock of goods 6 months longer than is actually necessary cuts quite a hole in the net profits; and to take the chance that there will be a slump in the demand that may make it necessary to carry some of the goods over for another year is asking too much of the banks and stockholders.

The answer to the problem of fluctuating work, from the point of view of the employe, is to learn two trades, one to practice in the winter and the other in the summer. There

are a great many men, for example, who work in textile mills in the summer, but are found in the woods as choppers in the winter. The women who work in the canneries are largely drawn from the farms and homes. They come in merely to earn pocket money and are quite content to go home when the season is over. Toy makers are usually skilled at metal or wood work and can swell the ranks of those trades when their own trade is dull.

**33.** The effect that seasonal work has on employers is not, however, so readily met. The shop that runs on seasonal goods is a mischief maker for the employer whose business runs continuously; for the manager of the seasonal shop must get his help in order to pay dividends, and he will surely get it even if he has to bid for it. This disturbs the labor market for all other employers in the vicinity. When the season's work is over the workmen who took the larger pay and left the all-the-year-round shops expect to be taken back; but they are restive unless their wages are increased to the rate paid by the seasonal shop. The most obvious remedy for this condition is either to get the seasonal shop to take on some work that can be done with the same equipment and that will keep the shop busy the rest of the year, or else to get some other firm into town that will run a seasonal shop in which the same kind of people are employed but whose work comes at another part of the year. Naturally enough, the kind of seasonal work that is the least disturbing is that which can be done by women. They can then come from their homes and do the work and return after the season is passed. To be sure, many of them will, in effect, disobey the paternal laws that forbid their working more than a given number of hours a day; for they will do nearly as much housework night and morning as they did before they went into the shop, but nevertheless no one appears to suffer from their doing it.

**34.** The periodic suspension of business on account of panics or near panics is not so readily handled. The best advice that can be given on that score is to remind oneself that business does not really suspend during such times. As



a matter of fact, the business may not suffer any very great loss of sales during a period of unrest. The cycle is usually as follows:

First: Business is extremely good, every one is optimistic, production is large, and banks are willing to lend money on goods in process and in transit.

Second: Merchants find that they have overbought, slack off their orders, and manufacturers, scenting trouble, shut off production. Workmen do not get so much wages, have less to spend, patronize the stores less, and retailers cut down their orders still more. This reflects on the manufacturers, who shut down entirely, which reacts again, and so on.

Third: Employees, finding their savings gone, must have work. They accept cuts in wages, and gradually business picks up, orders come in because the workmen find they have a little more money to spend, and business in general becomes good enough so that wages go up, and conditions are right to start the cycle all over again.

Two remedies will be necessary to stop this cycle or at least to reduce the severity of the changes: one, a decision on the part of manufacturers not to overproduce; the other, a decision on the part of workmen not to profiteer on wages.

**35.** It is impossible for manufacturers not to overproduce unless they know what amount of their products the markets will absorb; and even then overproduction can be avoided only if they will agree among themselves not to produce more than their allotment. Even with such an agreement, they are in the position of not knowing from day to day what they may meet in the way of foreign competition or whether foreign markets on which they are depending will be shut off by newly imposed customs duties. However, it does seem reasonable to suppose that competing firms might have enough confidence in one another to compare notes on their sales and production. The little that they would give up in the way of information would surely be offset by the amount each would learn.

In one organization of manufacturers, all in one line of business, the representatives of the different firms at their meet-

ings deposit in a hat a slip of paper on which is set down, without signature, the amount of their business for the past year or quarter or whatever unit is decided on. The largest firms divide their amounts on two or more slips so that no one can guess whose reports they are. The amounts on the slips are then added and the totals are read to the assembly; in that way each firm knows whether the total amount which is likely to be sold is being made, and whether apparently some part of the market is not being supplied. If there is evidence that there is overproduction the members slow down a little on production and speed up the sales force. The result has been to stabilize the business considerably.

**36.** The other requisite, that workmen shall not raise their own wages to the point where they can overbuy, seems at first sight to be within the province of the employer to settle by not acceding to their demands. That is, however, more easily said than done. No one likes to see a competitor getting business and making a profit that he might be making himself. When business is good, overhead charges are low in proportion to business done, and it is possible to pay high wages and still make a profit. The natural thing to do is to let the workmen have their share, rather than to enter into controversy over it, and their share turns out to be enough to make them extravagant in their expenditures and slow, not to say lazy, in their ways in the shop, thus starting the cycle that brings them back to poverty.

**37.** The only way, then, that we can hope to avoid the unemployment that comes with the periodic changes in business is to educate both employers and employes into greater sanity, and less tendency to "hog" the profits from doing more business than the condition of the country will permit. Some gain is being made by the publication of the condition of business. For example, farmers can tell from the reports of the Department of Agriculture whether more or less than the usual acreage of winter wheat has been planted, and gauge their own planting in the spring accordingly. The same is true of other crops. There is, however, nothing quite so compre-

hensive for other lines of work. There is no way for a machine-tool builder to know with certainty whether the combined efforts of the existing shops will supply the demand that will exist during the coming year, because the number of machine tools to be needed depends on conditions in a multitude of other manufacturing plants. However, a great advance has been made in this respect in recent years, and there is not much doubt that as employers get more confidence in each other through their organizations they are getting a better understanding of their labor problems, which can only work for improvement. It is probable that the hard times that followed the World War were much less hard than they would have been if the same ideas were in men's minds as were there in 1873 or 1893. The tendency is toward a greater desire and willingness to live and let live.

#### OFFICE ORGANIZATION

**38. Relation of Office Forces to Various Departments.**—Usually more than half of the office force in a manufacturing plant is devoted to the production part of the firm's work. This includes the planning, the order, the cost, and the efficiency departments. All these departments employ typical office clerks and executives, who are of necessity familiar with the use of figures and the fundamental principles of bookkeeping. They also employ stenographers, typists, operators of adding machines of various types, in fact they use every device that is used in any other form of accounting. Therefore, any study of production must necessarily consider the relation of these people to the shop itself.

First of all, it will be noticed that there appear to be barriers between the office men and the production men. The office force wear cleaner clothes while at work. They use better English, and they have on the average a better formal education than the production men. Therefore, the shop men imagine that the office looks down on them. Sometimes they are right, but more often than not the office man is envying the shop man his knowledge of a trade from which he can

make more money than any one but a certified accountant can get in the office.

There are, however, always men who would like to jump the barrier from the shop side, because they see so many cases where the men in the office have gone into high positions in the organization. They find that in some places knowledge of business, and the ability to forecast the future from the past, has counted more highly than knowledge of the technical side of the manufacture of the product. When such a man comes knocking at the gate that leads from production to the office, he finds immediately that the office men get so much less money for their time that he cannot, or he thinks he cannot, afford it. Such a man finds his best entry into the office part of the work to be through the planning department, where his knowledge of shop work helps him to understand and straighten out snarls into which some man without that knowledge has thrown the shop.

The planning department, in order to be efficient, must have in it men who understand manufacture thoroughly in every detail. No shop that allows its foremen or its employes to maintain secrets of the business by themselves can maintain a planning department and make it effective. Sometimes, in order to launch such a department well, it is politic to take into the department from the shop some man who is known to have secrets of his own and then set him to work ferreting out the secrets that other workmen have.

The office men are all paid out of the overhead charges against production, so they are literally a "necessary evil" from the shop standpoint. However, they are necessary. The problem is not only to secure as great efficiency in office work as possible, but to be sure that no unnecessary work is done. That is, records that cannot be of use should not be made. Periodically the work of all the office departments should be gone over and the work that they do set off against the probable returns that may come from it.\* A planning department can be imagined that would plan the work thoroughly and make it come through the shop smoothly, and yet keep no records whatever; but, unless records are kept, the head of

the department will have to be kept on the job indefinitely, no matter what provocation for his dismissal there may be. There is likewise need of records of the rate of progress of each job, so that the rate for the next job may be checked up and the errors made the first time it goes through avoided the second time.

**39.** In order to keep records, there must be a force large enough to keep them up to date, else the records become historical only, and of very much less value than they might well be. Consequently, there is no profit to the company in stinting the number of people on the office pay roll, provided there is necessary work to keep them all busy. The same reasoning applies to the executives of the office force. The mere ability to keep some semblance of order and to see that every one is putting in full time is not enough for any of these executives. They need to be men capable of organizing and of improving on organizations. Of course, improvements in organization and methods may be effected by bringing in a consulting specialist, but he cannot be kept on the job constantly, and the men in the organization itself must be the ones to put into effect the plans that the consultant may suggest, if such plans are to be the active force in the work that they should.

Moreover, there is need of a central head in the office, who will see to it that there is no duplication of effort through jealousies or through ignorance on the part of one department head of what records another is keeping. Too often, jealousies cause a department to withhold information that another needs, and make it necessary to have clerks employed getting the information from its original sources, or one department may purposely keep certain information in such a form that another department may have to reclassify it entirely before it can use the information. These things can be straightened out by a central executive, the office manager, if that name is acceptable, or by any other official who has the authority to delve into the records of all departments.

Conditions similar to those just mentioned may exist because of lack of interchange of ideas between departments. Often departments grow up and get so large that their heads have no time to look around and find out what other departments of the office are doing. This is an unfortunate situation, but there is no certainty that such heads will look around, even if enough assistance is given so that they have time. Habit is strong. The office manager, however, is known to be responsible for inequalities between departments, and no resentment is usually shown to his inquiries where there would be if another department head were to make the same inquiries.

**40.** From the viewpoint of the production department, almost all office activities tie up with some other work. It is necessary to keep records of men's time for two purposes, one for the pay roll, the other for cost keeping. The employment department is concerned as to their attendance and their promotion or demotion. These departments cannot be considered as independent units, but must all work together. The same is true of the planning, the efficiency, and the order departments, and so on through the office work. Standardization of the working conditions in the office departments is also necessary. Many shops treat their timekeeping departments like the shop workmen, the cost department as purely an office force, and the planning department in between the other two. In point of hours there is need that the timekeepers be on the job while men are working, no matter how long, and part of the planning department is needed whenever any of the work they have planned is running, just as an operative is needed even when an automatic screw machine is running smoothly. But there appears to be no reason why the conveniences and comfortable working conditions of the office force should not be shared by all of that force, regardless of whether their duties take them into the shop or around the yards. It is well understood that the office force draws less pay for a given time spent, usually because it receives more of the non-financial rewards than the shop men. That is, the office men have more comfortable working quarters, more vacation, better toilet



facilities and more of the refinements, and longer tenure of job; although this last is apt to be because they are willing to stay rather than that the management is any less anxious to have a low labor turnover in the shop.

**41.** It is undoubtedly a profitable thing to establish a definite plan to insure that every office worker shall become acquainted with his or her job, what it is for and what it leads up to, rather than to drop them into vacant places in the force and trust to luck that they may find out from others how to do their work as is required. Office people will average of higher intelligence than the shop, if we leave the higher executives of both out of consideration. This is unfortunate for the shop, but comes about through the use of machinery that makes possible the employment of men of less intelligence in the shop. The office people, however, cannot know what is required of them until they are told. Telling them a great many details all at once is not economical, because no one can comprehend a great many new details at once. Time is required to assimilate them. The assimilation is much more thorough and easy if the new employe is told why each thing is done as it is, what has gone before it, and what follows it. This is readily done if it is the business of some one to do it. Often it is well to place a new employe in the departments whose work precedes the one into which he is ultimately to go, and possibly in the one into which the results of his work must go; in this way he will learn to have a respect for the people who do the other work and to have a sympathy for them whenever things go wrong for a time. Business men complain that they constantly receive letters, bills, and orders that indicate on their face that the persons who wrote them are not acquainted with the work about which they are writing. Such experiences should teach employers to give their own employes the opportunity to know enough about their business so that they can act intelligently about its details.

### THE WORKMAN'S PART IN THE ORGANIZATION

**42. Methods of Securing Cooperation.**—All that has preceded has been written from the standpoint of the organization methods which have become standard. Recently another phase of management has come into prominence, not so much because of the great number of firms that have taken it up, as because of the prominence of the few that have gone into it seriously. This movement has various names, industrial democracy, shop committees, profit sharing, and so on. They all are an attempt to find a way to take the employe into company in the business at which he works. The reason for this attempt is in some cases the pressure of labor unions, in others the fear of the pressure that they might exert, in others purely a desire to do the right thing, and in still other places a desire to make all the profit possible, even though it be by appearing to give up more of the profit to the workmen.

Fundamentally, every one concerned in production, whether he is a stockholder, a director, an official, or a workman, is dependent on the good management of the firm. If the firm is prosperous, there should be enough profit to go around to every one. Healthy growth of the country or any community depends on there being enough profit to go around, and on its being passed around. Business cannot be obtained under normal conditions unless the firm is in a position to manufacture at least as cheaply as its competitors. Business cannot be held unless the firm can manufacture as good goods as its competitors. Neither of these things is assured unless the workmen and the whole organization are in harmony and every one feels satisfied that he is with the right firm.

**43. Distribution of Stock.**—The first attempts to secure cooperation were in the form of profit sharing, a course that is lined with the wrecks of firms that have attempted it. The difficulty in profit sharing arises because the profit distributed becomes a gift, no part of which can the workman trace to his own efforts, and in which he has no share other than as an acceptor. The thing which more recent experimenters have

tried to do is to make the employe responsible for something or other that would definitely tie him up to the business and make him see that its success depended on his own and other men's exertions.

These attempts have crystallized in two prominent forms, one the distribution of stock in the company, the other the shop committee. The distribution of stock is not usually intended to give the employes any considerable voice in the management, or at least not to give them much voice for a long time to come. The most notable example of this plan is the stock distribution of the United States Steel Corporation. Ultimately, it is possible that the entire stock of a corporation might get into the hands of its employes; but such a probability is not great, even when workmen are given every chance to buy on the instalment plan and at low rates. For that matter, there appears to be no reason why employes as stockholders should not be a welcome addition to any company, regardless of whether they become so through the wish of the management or through their own initiative. The only way they can get stock is by paying for it in one way or another. The wisdom of such a move is more to be questioned by the men themselves. They, as individuals, can hardly be expected to secure enough stock to make each one a power in the company, and therefore from a purely economic point of view it is wiser for them to scatter even their small investments among several strong companies.

**44.** Consideration of the question of stock distribution should be based on the kind of stock offered and its privileges. In general, there are three ways of financing a corporation. The first, through issue of bonds, which are really notes issued for borrowed money, bearing definite interest and having a definite due date when they must be paid. The second, by issue of preferred stock, in exchange for which money is loaned to the corporation and on which a definite interest rate is set, but the money is never due. The only way the capital investment in preferred stock can be realized is by sale of the stock to some one who is willing to buy. Preferred stock may

have voting powers or not, according to the agreement under which it is issued. The third method is by common stock, which represents money invested in the company, but which takes its chances of return of both capital and dividends according to the prosperity of the company. It is usually voting stock.

Of these, it is seldom if ever that employees are purchasers of bonds. Preferred and non-voting stock seems to have no particular attractions. It is the common stock, voting or non-voting, that is of consequence. This is the stock that takes the large risk, and which also can pay large profits. It represents the gambling element in business. Good management and cooperation make for a profit, poor morale and confusion make for loss. The condition of the times also may make for a loss. In many firms, however, the common stock does not represent any money investment. Its value is dependent, not so much on what it might bring if the company were liquidated, as on the probability that it will pay dividends. In normal times a stock that has regularly paid 6 per cent. dividends for a long time and of which nothing is known that will prevent its continuing, is worth par irrespective of whether or not it cost the original owners more than the paper for printing the certificates. If the company is one that has no intrinsic value in its common stock, printing and distributing shares is merely giving out a share in prospective profits. The common stock is seldom assessable; consequently, the only way it can share in losses is by foregoing dividends, or by a fall in its market price. However, if this stock is placed in the hands of employees, the fact that its dividends vacillate according to the conditions of the times is enough to give them a very lively interest in its value. The usual method of distribution of such stock is either by outright gift, if there is no intrinsic value, or at a rate which is somewhere between its book value and the market value in normal times. When common stock is given to employees it is likely to be voting stock, but with the proviso that in case the employee severs his connection with the company the stock shall either be bought in at some agreed price, as the market price, for example, or that it shall

be exchanged for non-voting stock. There is no apparently good reason for doing this, unless it is that the company feels that it is making a gift to its workmen. Gifts in business are bad, and particularly so between employer and employee.

**45.** One notably successful enterprise has for a number of years given all employes whose pay was above a pre-war level of \$1,200 a year, shares in their company in such a way that the actual management is for the time being in the employes' hands. The company reserves the right to have the voting power revert to the holders of preferred stock at any time that losses take the place of dividends. This way is fairly safe for the company, and at the same time gives that element of the employes who are in the best position to make the stock profitable the best opportunity to express themselves and to make the business what they would like it. It seems as though some plan modeled on this idea is really necessary to any kind of stock distribution; for there are always many employes who are unable to understand the intricacies of business, and who are better off not to try. Moreover, it helps to put the line of cleavage between the managerial class and the workman's class lower down the scale. It is unfortunate that a line of cleavage should exist; but since it does, the only way to get rid of it appears to be to push it down and down until it ultimately reaches the bottom. Under the ordinary form of organization, very few under the rank of foreman belong to the managerial group. Even the foreman has very little opportunity to know about the business itself, but is merely forced by his position to side with the management on a great many matters in which his sympathies may very well be with the under dog. By bringing all the employes whose work requires high intelligence into the management, there becomes a much larger group who are responsible for wages, working conditions, and so on.

In order fully to accomplish this result, however, it appears to be necessary not merely to put voting stock in the hands of employes of the higher grade, but automatically to give them a voice in the management. This means literally what

it says, a *voice* in the management. It means that they have the opportunity of presenting their views on any subject that affects their relations with the company directly to the management, with the expectation of consideration and a reply.

**46. Shop Committees.**—For the purpose of giving the employes an opportunity of expressing themselves in the management, shop committees have in some cases been formed. Some of these have come about through the distribution of stock and more through a feeling that some such opportunity ought to be supplied. The shop committee is also looked on in some quarters as an endeavor to substitute a controllable union within each individual shop for the present form of unions. This may be the idea that is most attractive to some employers, but it is not necessary to consider this as the controlling factor.

The wisest attitude in regard to the matter of shop committees may perhaps be better seen by considering carefully the relations between the employer and his employes. In general, the employer has somewhat the advantage of position. He furnishes the capital, which consists of savings, his own or some other person's, and without which the business cannot be started or continued. In the case of a large corporation, this capital is the accumulation of the savings of thousands of different persons. If most of these have themselves been wage earners, the company is likely to have a management that is fairly disposed toward its employes; if the larger number of stockholders have inherited their capital, or if they have won it by speculation, or if they have simply borrowed it, there is more danger that they will have labor troubles. This capital is however absolutely essential in order that the business may start at all. It is equally true that business cannot be carried on without the necessary labor; and if labor is lacking for any reason the business will fail and the larger part of the capital will be wasted. This lack of labor may be on account of poor judgment in the location of the plant, it may be due to poor working conditions, or low wages, or long hours, or to any one of many reasons, including strikes, union



or otherwise. However, capital is wary, and it will not invest in a town where strikes are a habit. Nor will it invest until it is satisfied that that particular place affords a good chance of making a profit on the money invested. The day when a shop is located in a town merely because some one man lives there is rapidly going by. If a town is known to have an element of unrest, it is shunned by firms that are well enough acquainted with business to know how much strikes cost.

It is safe to say that the firms that have entered on a plan of shop-committee organization have really done it as a form of insurance against strikes. The plan has not always worked out as expected, but it appears to have its advantages, and to all appearance there seem to be more advantages than disadvantages. It is likely that a proposal to install a shop committee plan will create suspicion on the part of the employes, but for that matter so does every move on the part of the owners of every shop. The fear is of the unknown. The plan has not yet been thoroughly tried out, but experience will show whether it is adapted to general use or to what kinds of manufacture it is applicable.

**47. Effect of Shop-Committee Management.**—The first effect of a shop committee is the same as the installation of a suggestion scheme. Every man in the shop who thinks away from the normal immediately makes suggestions. Among them there are sure to be some good ones, which should be carefully winnowed out. The next thing likely to happen is an attempt by the men who belong to organized labor to secure places on the committees and then to get other men from their organizations on. For this reason, great care should be taken when a committee system is installed for the sake of breaking up the influence of the unions. It will be much better for the shop-committee movement if all the first experiments are made in open shops, so that the plan can be worked out where it will have a chance of a sympathetic hearing.

In any event, the test of the system is in whether it makes men more tolerant of each other, and whether it is carried out in strict honesty. There is no escape from the fact that labor

unions have nearly always been forced by the employers to adopt a fighting policy, and to elect a fighting delegate. Since "all is fair in love and war," and the unions at least consider this war, it is no wonder that there are many things done by both sides that each ought to be ashamed of. But it seems as if when men who are interested in the same problems sit down together, it should be possible for them to come to such an understanding of each other that they will grow to have confidence, and not suspicion; and it is usually suspicion that promotes or provokes the hatred that is so often in evidence when the representatives of workmen meet their employers. The committee system would seem to be a way to bring all potential disputes out in the open before they become aggravated and a source of violence.

The two problems of high labor turnover and strikes have been classified as one by calling the high labor turnover an individual strike, which it is in a great many cases. That is, the workman goes out from the shop in which he was working for the same reasons that a large body of workmen go out in the case of a strike. In fact, it takes more courage to throw up one's job as an individual than to do it as part of the whole shop force. However, the individual striker is more subject to argument and can be reasoned with, where there can be no reasoning with a large number.

It is almost safe to predict, however, that the time is coming when men will not be employed until they have been examined by a mental specialist who can say with considerable certainty whether the candidates are likely to become cooperative parts of the organization, or whether they must from their own dispositions always be antagonistic to order and to cooperation. There are not a large proportion of this latter class of people; but it seems that it would be for the good of all of us that they be segregated and not allowed to influence others with whom they are now thrown in contact. These people will in their own defense cite the action of noted reformers of the past and the good which they have started, but they overlook the fact that the non-cooperative type of reformer has almost always been consumed by his own fire.

# PERSONNEL RELATIONS

(PART 1)

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## PERSONNEL

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### GENERAL CONSIDERATIONS

**1. The Labor Problem.**—The number of employes required for a production of a given value varies greatly in different shops. The more refined the product the larger is the pay roll compared with the invoices of materials. For example, many more persons will be employed at a higher expenditure of wages in making iron ore into automobiles than in simply smelting it in a blast furnace.

Thus the problem of labor, including every grade of physical and mental laborer, is of varying importance in different shops, depending on the conditions that surround each.

In general, however, it is safe to say that nearly everywhere the flow of labor from shop to shop is too free for the good of either the shops or the employes. The problem of reducing this flow is the problem of the personnel department, no matter under what name it may appear on the particular organization chart.

It is only within a very few years that the labor flow has been recognized as a problem at all. Previous to that, it was a commonly accepted opinion that the flow of labor was inevitable and that it was a misfortune due entirely to the fault of the employes. Moreover, since the cost of training new employes is entirely concealed so far as any cost account-

ing shows, the expense due to this rapid flow of labor was not appreciated.

**2. Personnel Work as a Part of Production.**—The old saying, "Well bought is half sold," applies quite as well to labor as to materials; in fact, when we consider the nature of labor, it is more pertinent. The greater part of all the materials used in manufacture can be stored away through times of depression and used on a rising market quite as well as at the time of purchase. On the other hand, every day's time which each man does not work has gone past and can never be recovered. To be sure, up to a reasonable amount, time must be allowed for recreation as well as for sleep and meals; but, in general, each man lives and does his work by the lifetime rather than by the day or week. His life is not necessarily prolonged by vacations or by lay-offs or shut-downs; so it is safe to say that everything that decreases the number of days he works each year is not merely a loss to him but a loss to the community as well.

The personnel worker then has a real part in manufacture, just as important as that of the purchasing agent, up to the time the employe goes to work, and just as important as that of the superintendent in charge of machinery and equipment, after the employe is on the job; and at the time the employe leaves the personnel man has a still more important function, that of discovering the reason why the man left and of finding a way to stop that particular leak if possible.

**3. Position of Personnel Work Relative to the Management.**—The personnel work is an essential part of management, for it has a large effect on the cost of production. In too many cases the management has gone at it half-heartedly by either hiring some man known for his "big-brotherly" attitude, or because he was a psychologist, or sometimes because he was a relative of the manager and had to have a job. These men have been thrown on the job to sink or swim. Most of them sank, unless they were of the political type that did as little as possible and did the greatest possible amount of talking about it. Many failed, not so

much on account of the method by which they were selected, as because they had no real backing from the management.

Since personnel work is a problem of management, it would seem as though it should be under and very close to some member of the firm or corporation who will give very liberally of his time and energy. This does not mean that the head of the department can be a figurehead, but that the policies of the department become and are the policies of the management. For example, if the employment department decides that it is wise to transfer men from department to department until a suitable place is found, or if the safety engineering department decides to post notices showing the relative number of accidents in each department, such procedure should be known to all as the act of the management operating through the departments as executives.

Unless this backing is extended by the management, there is absolute need of a very strong man in charge of employee-relations work. To be successful, he would need to be a stronger man than the general manager, because he cannot throw any of the safeguards and protections around himself as can the latter. He has to be out in the open and ready to defend his position at all times, whether against a foreman or a disgruntled workman or against a superintendent, for he becomes the center around which some very vital matters concentrate. It sometimes seems as though all the weaknesses, frailties, passions, and sensitivenesses of the whole plant center on problems that must be solved, if solved at all, in the personnel department.

4. That it pays to have thorough personnel work done is evident; for it has been demonstrated many times over that such work can hold the labor turnover of almost any kind of a plant well within the 100 per cent. mark, while it is not at all uncommon to find labor turnover running as high as 250 or 300 per cent., and during times of great unrest double these figures have been common. At the same time, and during the height of the unsettled conditions, firms have maintained labor turnovers of 60 or 70 per cent., when other firms next

door to them and operating without a personnel department were having ten times the turnover.

The cost of labor turnover is always problematic, and investigation of the amount involved brings employers face to face with astonishingly large figures. Take, for example, the case of a shop employing 5,000 people and having a labor turnover of 300 per cent. If the average cost of training an employe is only \$50 and the turnover can be cut to 100 per cent. by proper care, it is evident that there is a possible saving of half a million dollars. However, the very magnitude of the possible saving makes hard-headed business managers feel that there must be something wrong about the statement, very much as a banker is suspicious of an investment that promises over 10 per cent. dividends. However, the figures just given as an example are probably well within the true ones for a great many shops. The business of the world has been conducted much more wastefully, so far as labor is concerned, than in respect to materials and methods of production. Shop after shop has figured its efficiency, measured in terms of speed of machines, automatic machinery, etc., in most minute terms, and has watched every avenue of loss except the large one of inefficient labor. This loss in labor cost has not troubled the works manager, because it is not the loss of something that he has had in his possession. If he buys 100 tons of pig iron and only produces 90 tons of castings, he realizes the loss and makes every effort to minimize it; but if he buys \$100 worth of labor and only gets 90 per cent. of the returns that he might if it were not for the expense of training the workmen, he does not realize it, because it is a condition to which he has always been accustomed.

**5. Progress of Employment Work.**—For the reasons that have been outlined, work for employes, such as would lead to decreased cost of production, has not made very rapid strides. It has suffered the handicap of beginning as so-called welfare work, which was paternal and more or less advertised as philanthropic. Employers vied with each other in telling



how much they were doing *for* their help. They had dances, rest rooms, promoted athletics, had lectures on home cooking and hygiene, offered to invest employes' savings for them, and in many other ways did things which appeared to their employes as being strangely philanthropic, and which made the latter feel that if the company was making sufficient profit to do these things it could better have increased wages. This kind of employe-relations work appeals to a very considerable class of workmen, and especially work women, and cannot be neglected by the student of modern methods; but there is little room for doubt that it did slow down the progress which the movement toward a more efficient personnel might have made. It was based, to all appearances, on a misapprehension on the part of employers as to the intelligence of their employes. Inasmuch as the matter of personal intelligence recurs in other relations with workmen, it is well to give it careful consideration.

**6. Intelligence of Workmen.**—The average workman in skilled trades is about as unbusinesslike as the average college professor, doctor, or minister. That is, he presumes that all other people with whom he deals will be as honest as he is in his own interpretation of the word honesty. His code of ethics is not that of lawyers and business men in general, so many of whom stick to the old Roman sentiment, *Caveat emptor* (Let the buyer beware). The workman expects, when he is hired by a new employer, that he will have the benefit of whatever has appeared to him to be the customs of the trade which he follows. He is very apt not to inquire into what the customs really are, but to accept what is offered. That is, he may go into a town where the rate for a skilled machinist is 90 cents an hour and he may accept 70 cents for quite a long time without knowing what to believe is the going rate. This is comparable to the professional man who lets his customers or clients take long periods for payment of bills, or who does not insist on a living wage because he feels it unprofessional to spend time in attempting to better his lot from a financial standpoint. However, it is not safe or

right in either case to assume that because the workman or professional man does not demand the returns which he should have, or does not, except when he acts in unison with others, have the courage to stake his job against his future, that he is unintelligent. Nor is it safe to assume that education is definitely connected with intelligence. A man may be entirely unable to present his case in convincing English, he may be timid about presenting it at all, and yet be entirely capable of understanding the purpose back of paternalism. As a matter purely of personal opinion, the writer would say that, out of thousands of employers and employes whom he has met, there is not a great deal of difference as regards intelligence in general. There is a great deal of difference in technical knowledge, self-assertion, and self-control, and it is such things, rather than special intelligence, that appear to determine success in business.

**7. Relation of Personnel Work to Foremen and Superintendents.**—Even though the management extends its best support to all the things the personnel department does, unless the work of the department has the sympathy and support of the foremen and superintendents it will not meet with a full measure of success. Hospital care, safety engineering, employment work, follow-up, all to a certain limited degree take away from foremen certain prerogatives which they have formerly exercised. No one, no matter how burdened, cares to be relieved of any duties, if such relief tends to decrease his power or his apparent standing over other men. Good employment management selects men suitable to the work, assigns them to certain foremen, and transfers them as the exigencies of the business demand. Good safety engineering takes away from the foreman the right to order a man to use machinery that is dangerous, and stops machinery from being used at all until put in safe condition. Good medical care tells a man when to go home and how long to stay there, with little regard to the pressing needs of the shop.

It is essential to the greatest profit over a long period of

time, that the right man be put in the right place, even though the foreman in charge has personal antipathies against him or men like him. It is necessary to the greatest profit, that the work of a man for months shall not be offset by the loss in money and in production due to an accident caused by the carelessness of a too zealous foreman; and it is necessary for the sake of future production that a man should not be allowed to prolong a slight cold or headache into a long illness, through lack of consideration of his health. It is, however, too much to expect that any one man can be a specialist in production and at the same time a specialist in employment, safety, and medicine, not to mention many other functions of the personnel department.

It will undoubtedly take many more years for a new crop of foremen to grow up who are willing to accept this specialized assistance in the spirit in which it is given. A few of the older foremen understand the conditions clearly, but many do not. In some shops they have had each of these things, so to speak, thrust down their throats, with only the briefest sort of explanation of the objects to be attained. Very often it happens that the directors and general manager, who are apt to be better informed of what their competitors are doing, decide on these innovations and insist on their being tried out while the works manager is yet unconvinced and is only biding his time to discover flaws in the details of the plan, which he will magnify into mountains of discontent. It is, therefore, very necessary for any one contemplating employment in a personnel department to find out in advance what the relations are between the department and the foremen. With the support of the foremen he can accomplish a great deal, but if they are opposed, or worse still, if they damn it with faint praise, he can depend on having an up-hill fight.

**8. Relation of Personnel Work to Employes.**—In many ways the personnel department is an interpreter of the views and wishes of the employes to the management. Most labor troubles grow out of relatively small misunderstandings. They may be intensified by outside influences, but the seed of

discontent is very often within the plant. It is part of the duty of the personnel department to be so much in the confidence of the employes, and rightfully so, that they will bring all these petty troubles to that department rather than nurse them into big troubles. This condition of confidence is not easy to arrive at, because many of the things that employes will ask for cannot be done and are not conducive to production. Then, the people who are the most apt to bring their troubles out for an airing are not necessarily the ones who most fully represent the real feeling of their fellows. The real feeling can be discovered only by knowing a large variety of the workmen, including those who do not seem to desire to become acquainted. As a general thing, however, the departments like the employment, safety and hospital, which are apt to irritate foremen, are likely to be accepted by the men themselves, especially after they become familiar with the working methods. For example, almost any man can realize the advantage to him of making application for jobs where all the openings in a factory are known, rather than where he can see only one foreman who may know nothing of the needs of his next-door department. He can also realize the comfort of having a good place to wait for attention. He may wonder what need there is of the searching inquiry that is made regarding his past, but he is very much used to this now and does not resent it. He appreciates the value of a safety department every time he sees that the department insists that machines shall not be used when they are not in safe condition, unless he is on piece work, in which case he may resent the interference. He recognizes the value of the medical department every time he sees a man who has been hurt or taken sick come back into the shop well cared for and pleased with the treatment he has had. The employe may have resented the physical examination through which he was put as an applicant; but, if his natural fears have not been excited during the examination and the physician has some words of kindly advice to give him in addition to the report which he makes out, the advantage of working where there are such facilities becomes apparent. It is a matter of experi-

ence, that men are much more impressed with these things than they are with some of the more purely welfare work that is done. They also appreciate housing, when it is done on a scale that seems sensible, also transportation, feeding, cooperative buying, and mutual benefit associations; but they appreciate them more if they have some hand in them themselves. Employes realize that there are things which demand experience along technical lines and for which the company must necessarily take full responsibility, and for the doing of these they have true appreciation.

**9. Ideal Relations Between Employers and Employes.**—The older ideal among employers was for the employer to be a perfect father to his workmen and to direct them so that by thrift and economy they would some day acquire sufficient money to buy out the business and he could retire on his fortune. This attitude, however, presumes a very great confidence in his own infallibility on the part of the employer, which, however, was not lacking a few years ago. It is only comparatively recently that business men have begun to realize the need of specialists, and to call them in.

The older ideal among workmen was a good steady job paying an always slightly increasing wage, a job that did not leave them so tired at the end of the day that they could not enjoy their evening. It must be admitted that this is not a high ideal, and that only a few workmen had sufficient ambition to make any attempt to go higher.

Present-day ideals, not by any means reached, call for such a relation between employer and employe that both will work for the greatest possible production with the least tie-up of capital, consistent with work of the grade needed, and consistent with the comfort and long life of the employe and the reasonable life of the equipment.

This relation can only be brought about when both workmen and employer have equally attractive incentives to bring it about. Just so long as either believes that the other is making more than his share of the profits this new ideal can-

not be attained. A knowledge and belief that profits are rightfully divided is the foundation on which almost the whole matter rests. The profits which an employer makes may be wholly a matter of conjecture on the part of the employe. He may judge, because the manager continues to use his limousine when he is saying that business is flat, that the latter is untruthful. Judging from his own experience, the employe may not be able to see how any one can be other than broke or flush; he cannot conceive of another man's having a reserve fund with which to equalize his living conditions, adding to the reserve when times are good and eating into it when they are bad. To the mind of the workmen the ostentation with which many successful business men and their families live is a constant reminder of the things which workmen cannot have. They see the better clothes which the women of the wealthy families wear as compared with those of their own wives and daughters, and they see the automobiles and chaffeurs, as against their own cars and their own driving, and, whether right or wrong, the comparison is odious.

#### **10. Limitations of a Personnel Department.**

Ideals cannot be reached in a moment. The fact that the management have high ideals and are willing and anxious to put their relations with their employes on a high plane does not necessarily make it possible to put those ideals in operation at once. This is very annoying to the type of general manager who has surrounded himself with people who do his bidding at the slightest hint. He is surprised to discover that in certain directions he may be able to get what appears to be cooperation, but under the surface proves to be a policy of elastic retreat and advance when the pressure is diverted. He can inaugurate his ideal measures, but his foremen, or even the men, may fail to appreciate or make use of them. It is therefore wise not to be led into rapid expansion of employe-relations work, even though the men at the head of the company may be very enthusiastic about it. Soon their attention will be diverted to other things, and then the luckless employment manager may find the reaction



against his work to be too great for him to stand up under alone.

The best policy appears to be to attack the problem, in a going concern, by first doing the things that appear to be demanded by the existing conditions, and then to take up from time to time things that are more directly related to production. For example, it may be found, by keeping track of the men leaving the shop, that the turnover is unnecessarily large; further, that more leave from some departments than from others, or it may be found that men leave for certain reasons rather than for others. The result of this investigation may be transmitted to the foremen, without calling names, and the statement may be made that, in order to treat every one alike, in the future it will be necessary for all hiring to be done through one central point, but that no one will be hired who is not acceptable to the foreman under whom he is to work. From this point on, it is easy to introduce physical examinations of candidates, to start follow-up work both within and without the shop, and to establish whatever system may be decided on for making the selection of workmen. The greatest difficulty begins when an attempt is made to keep in the firm's employ men who have not proved acceptable to certain foremen, either by insisting that they be given another chance or by transferring them to other departments. Foremen for generations have considered it one of their most cherished prerogatives to discharge men at will, arbitrarily, for the good of the shop, or for the venting of their own displeasure. It is a bitter blow to many of them to have this time-honored right questioned. It should only be approached after they have found that the advantage of having an adequate supply of intelligent help brought to them is so great that they cannot afford to antagonize the employment department.

In the same way, the medical department can be built up, having purely advisory powers at first, and reporting physical defects which it finds to the employment department, with advice as to the work from which these defects should exclude the man. When the time comes when it seems best to give

the medical department the right to decide whether a man is in fit physical condition to go on with work which he wants to continue and which the foreman declares it is imperative that he should, there is opportunity for a clash, which can only be avoided by letting such things alone until the time has come when the medical department has made itself so well liked and so useful that the foremen cannot afford to antagonize it. In exactly the same way, the safety engineering department has to confine itself to measures that do not in any way interfere with production until it becomes an established and accepted part of the organization.

**11. Beginning Employment Work.**—The first and safest starting point for employment work is the supplying of labor to make up for the turnover which is found to exist. This is not nearly so profitable as stopping the leaks; but stopping the leaks involves apparent interference with past methods and is likely to cause trouble, as already explained. There is another advantage in not beginning with the leaks, and that is that the delay will give a good opportunity to study the causes of leaving, and this study can well be made in connection with the work of starting a flow of labor toward the shop, though action toward remedies for the leaving may not be taken for some time.

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## METHODS OF SECURING A FLOW OF HELP

**12. The Flow of Labor.**—Whenever business is good there is always a scarcity of help, and it is then that the greatest profit is to be made and the need of keeping the shop supplied is the greatest. Like the flow of water, labor flow can be accelerated either by drawing men in or by getting behind them and pushing them in. In general the best results are obtained from men who apply without being urged, because they feel that if they could only get a job at the shop in question they would be content to stay there the rest of their lives. The men who are pushed in, by scouts or by advertisements of high wages, are very apt to move about the country

and to go very freely from one shop to another, thus increasing the cost of labor turnover rather than improving conditions.

**13. Conditions That Attract Men.**—Men like to work where the wages are good, and especially where there is a chance to make some extra money by working overtime. Men are just as much bargain hunters as women, and they like to feel that they are getting something for nothing. This is apt to be carried to an extreme, and some men are inclined to take things very easy during the day to make sure of work enough at night to get even one hour's pay for work they have not done during the day. They like a comfortable shop comfortably reached. They like safe working conditions, though that is almost always an afterthought that develops an outward flow of labor after a bad accident. Most of all, the drawing powers are money and comfort. To a smaller extent, there is the social call; that is, some men much prefer to work among friends. If one of a little coterie goes to a certain shop, the rest are likely to follow soon after. This is a little more noticeable among girls than among men, and in a small town is often an important factor.

From this, it will be seen that what are known as working conditions have great influence on the cost of production, much more than is visible through increased speed with which the work is gotten out by any one man. If all the machinery in a shop could be kept in operation at a predetermined efficient speed, notwithstanding the usual rapid turnover of labor, there would be no reason to concern ourselves about it, but if only a quarter to a half production is maintained by a new man while he is learning the work, and it takes him 6 months to get up to speed, and then he leaves inside of a year, the increased cost is very considerable.

The first concern of an employment manager who wishes to secure a reliable flow of labor toward his shop, is to make the conditions within the shop such that men will naturally desire to get jobs there. The employment manager himself is not in a position to make good working conditions. However, he is the man who hears the complaints made by men who

are leaving, and it is his duty to see that a résumé of the reasons for leaving reaches the management, or as high an official as he can reach. Many of the things that are found to cause men to leave do not appeal to the works manager. He very likely may have come up through the shop and may have been so accustomed to even poorer conditions that he cannot see why men should prefer to work for some employer more sensitive to shop atmosphere than he is.

**14. Advertising for Help.**—Advertising may be direct or indirect. By direct advertising is meant printed newspaper advertisements, circulars, posters, or any means that directly states to whoever may see it, that the company is in need of more help. In general, direct advertising is to be made use of only as a last resort, because of the implications which it carries. It virtually tells not only prospective employes that the shop is hard pressed to secure men, but it tells the same thing to those already working for the company and also to its competitors in the field for labor. This unduly disturbs other people, sets the workmen in the shop wondering if they should not get more pay, gets competitors ready to offer larger wages, and in general should be avoided unless there is a need which no other means will meet.

Blind advertisements, or those in which the name of the advertiser does not appear, the replies to which are to be sent in care of the newspaper in which the advertisement is printed, appear to avoid all these difficulties. The greatest objection to such advertisements is that many men who would like to make a change do not dare to answer them for fear that the advertisement may come from the firm for which they are now working. This difficulty can be avoided by the person who answers an advertisement of this kind, if he encloses the answer in an outer envelope addressed to the newspaper or magazine and requests that the letter be not delivered if the advertiser is the firm which he names. This method is, however, so little understood, that blind advertisements are not so effective as they might be.

Possibly the very best advertising is that done by some

companies who use a certain space in every issue of a paper, and advertise in general that their employment departments solicit applications from workmen in certain specified trades. The fact that this is a constant advertisement takes away the danger of stirring up other people, and yet the advertisement makes certain that almost every one coming into town from outside will sooner or later apply to that employment department. In a way, it is a most welcome thing to a man, who for any reason finds it necessary to move to some city, to see in the papers what at least appears to be a welcome. He may realize perfectly well that all that the employment department may do is to put his name on a waiting list; but that is something much better than a mere notice, "No Help Wanted" outside the door. In fact, such a sign is something that any well-regulated employment department should never exhibit.

**15. Scouting.**—During times of great industrial activity, it is customary to try to divert the flow of labor from distant points. The theory of scouting is that by some means the employment department will discover territory in which there is unemployment, and by going there and offering transportation to their own town they will be doing a great deal of good in making a better distribution of labor. In practice, however, there is a great danger that scouting will be done where it produces the most immediate results. This is where there are the greatest number of men employed, rather than where there is the least work. Men pretty generally look up their own places to go, if there is more employment in one place than another; and the scout is very apt to find little that he can accomplish when he goes where there is no work, because it is exactly that place that the men who have any energy and life have left.

The only really legitimate scouting is that which is done with a long look into the future and which is based on getting people to come from one undesirable locality to another more prosperous, with better opportunities for advancement, better schools for children, and better and more legitimate opportunities for enjoyment, an appeal made not on the basis of

higher wages, but on better living conditions. The result of such a campaign is a slow but steady dribble of employes. If the town is up to the representations made for it, these people will write home and bring in others. Those that come through such influence are likely to stay. Those brought in by the usual scout method are very likely to use the means furnished them to come to town and to be found working for a competitor as soon as they get sufficiently acquainted with the town to know who he is. The exception to this is in the one-shop town where there is no other place to work. Shops in such towns, however, have their own problems, as it is much harder to get men to go to small places where schools are likely to be mediocre and the facilities for amusement almost sure to be poor.

In cases where men are really thrown out of employment, it is usually possible to pick up some desirable workmen, but in general the competent men have taken care of themselves before it becomes generally known that a lay-off is imminent, and what are left are of doubtful value.

In general, it may be said that scouting should be undertaken only as a last resort in case of emergency, and that no lasting good can be expected from it.

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## SELECTING FROM APPLICANTS

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### METHODS AND REQUIREMENTS

**16. Methods of Selection.**—With a supply of help coming to the employment department, how shall we decide whom to hire and whom to turn away? The most natural thing is to go by our past experience. The great trouble with experience, however, is that as time has gone on it has eliminated certain types of people from consideration. In youth we may have had unpleasant dealings with men of a certain race, and since then we may never have hired any of that nationality. Consequently, we have had practically no experience with them, and have no right to judge them. It



may be the same with red-headed men or men with crooked noses, or dark-complexioned men. The experience of one person who has thus shut out from consideration whole groups of people is unreliable and ought not to be tolerated.

Since every one is greatly influenced by the personal element, it is very hard to keep interviewers from making their selections according to prejudice rather than according to common sense or science. This tendency to select by appearances has been developed into a science by several persons, who have established considerable reputation for their work. Their basis for determining qualities of men has been scientific, in that they have made studies of many thousands of men and have drawn their conclusions from these studies, impersonally, and without any intimate acquaintance with them that would be likely to bias their judgments. These conclusions, however, are based entirely on physiognomy, and leave out all other considerations than whether the candidate is light complexioned or dark, and what the shape and contour of his head and hands are. The argument which they offer in support of their method is, briefly, that "as a man thinketh so is he," and that, whatever his appearance may be, it is the result of his thoughts, and therefore his face is all that it is necessary to consider. Needless to say, it is difficult for a great many persons to reconcile themselves to being judged by a face which they have been led to believe through all their lives was an inheritance only. Moreover, there are a great many employers who are by no means ready to take up with this method of selection, but prefer the experience of some man in the shop in whose judgment they have faith.

**17. Psychological Tests.**—For many years it has been a custom among psychologists to rate men's intelligence in terms of the normal development of children. That is, a man may be said to have only the intelligence of a 10-year-old child, by which is meant that he has the ability to think as fast and as correctly as a child of that age, this ability being determined by giving him a number of very simple things to do. This practice has been developed into a method of test-

ing men, not only for general intelligence, but for the specific intelligence necessary for success in a certain trade or occupation. This method has been tried out, and gives a great deal of promise of success; but a large amount of common sense and a knowledge of the ins and outs of the trades for which the tests are given is required in order to interpret the results correctly.

**18. Trade Tests.**—In a certain sense, every job is a trade test. That is, each man employed is being tested for ability in every job he does. The greater part of all hiring, even now, is done by the method of trying the man out on the job. That is, the interviewer in the employment office makes as good a selection as he can and turns those selected over to a foreman, who accepts them subject to their proving themselves to be competent.

In some trades it takes very little time to discover a man's ability. For example, the very way a blacksmith handles his tools and makes up his fire tells whether he has had experience at the trade or not; but it tells this only to men who have also worked long at the business and who know it from their own experience. The question of how good work he can do and how rapidly he can do it, can only be decided by keeping him on the job long enough so that he forgets that he is on trial and assumes his natural pace and his natural industry or lack of it. A barber can be discovered by his work on one head of hair. Every shop has some customers who would apparently not appreciate a good hair cut if they had it, and the new man can be tried out on them without much danger of harming the reputation of the shop.

On the other hand, there are trades where a try-out is very expensive; for example, that of a moving-picture camera man. Many thousands of feet of film are wasted on every pretentious subject, but enough is wasted at the best without trying out inexperienced camera men; so that it is not usual for a man to get a job unless his ability is well known. If he has no reputation, he must take an assistant's job and carry cameras and set up lights where he is told. After a while he

is allowed to turn the crank on some unimportant scene while the camera man takes a few minutes' rest; later on, if he shows that he has grasped the principles of lighting, he may get a chance to substitute, and then, in an emergency, to "shoot" a whole play. Between the extremes just mentioned are many jobs, ability at which can be more or less easily tested.

Many specific trade tests to be given to workmen have been proposed; as, for example, to give a cabinetmaker two pieces of wood and require him to make a mortise and tenon or a

Employment Department	
Name _____	Date _____ 191
Address _____	
Age _____	Born _____
Married _____	Children _____
Employed _____	Temperate _____
Last Employment _____	
Worked here before _____	
What Trade _____	
Remarks _____	
_____	
_____	

FIG. 1

dovetail joint; or, for a man who claims to be a machinist, to have a lathe handy and give him a piece of stock and tell him to cut a triple thread of some pitch not given on the gear plate, but which is possible with the equipment of gears offered; or, if the man is a draftsman, a general drawing may be given to him and he may be required to make a detail drawing of one rather difficult piece.

Such trade tests have a real and distinct value if taken in conjunction with other evidences of ability, and if they are varied sufficiently often so that men will not be coached to pass them. It is a fact that in any shop where any consider-

able number of men are employed, some one, either out of friendship or for a profit, devises ways to teach candidates just the things that are necessary for passing these examinations, just as in college there are always tutors who coach backward students to pass examinations. For this reason, it is necessary that the tests be sufficiently varied so that the employment department may be assured that it is actually testing the applicants and not merely letting them past.

**19. Conducting an Interview.**—As men present themselves at the employment office it is easy to pick out those to

Form 120, A 11-16 3000		APPLICATION	
Date _____		For position as _____	
Name _____		Age _____	
In person	By letter	White	Colored
Address _____			
Single	Married	No. of Children ?	Nationality _____
Total experience _____			
Last Employer _____		Date _____	
Length of service _____		Reason for leaving _____	
Last wages received _____		per _____	
Member Union ? _____		Name _____ No _____	
Member Secret Society ? _____		Name _____	
Drink ?	Ever work here before ?	When _____	Shop _____
Chew ?	Relatives in our employ ? _____		
Smoke ?	Could do _____	Experience _____	
How many positions during last 5 years ? _____			
Reasons for changing _____			
Physical data _____			
Impression _____			

FIG. 2

whom consideration cannot be given at that time. For example, if a man comes in, as they will, drunk, there is no reason for going through the form of an extended interview. If a man wants a job as a plumber and the firm employs no plumbers, but depends on outside firms, he need not waste any time. Likewise all applicants for laborers' jobs can be dismissed after a sufficient number have been engaged. On general principles, however, there should be some very brief record kept, on a card or slip, as in Fig. 1, showing the man's name and address, the line of work for which he applies, and whether he wishes to be notified of openings in the future.

These records are of value as showing what sort of a flow of workers there is to the plant. If the record has a line showing the last place the man worked, there is a chance to dis-

GROTON PLANT

GROTON IRON WORKS

GROTON, CONN.

APPLICATION FOR EMPLOYMENT

DATE..... POSITION WANTED.....

AGE..... IF SKILLED, STATE YOUR EXPERIENCE .....

.....

HAVE YOU WORKED HERE BEFORE?..... WILL YOU DO PIECE WORK?.....

WHERE WERE YOU BORN? .....

MARRIED OR SINGLE..... ARE YOU AN AMERICAN CITIZEN?.....

HOW LONG HAVE YOU BEEN IN THIS COUNTRY?.....

NEAREST RELATIVE .....

ADDRESS.....

ARE YOU EMPLOYED AT PRESENT? .....

PAY PER HOUR.....

FIG. 3 (*Front*)[illegible]

FIG. 3 (Back)

cover any tendency of men to leave other concerns in the vicinity; or, if the man has been working in another town, it may give an indication of the conditions of the labor market there.

20. If, after the preliminary interview, it appears worth while, the applicant may be questioned more closely and may be asked to fill out an application form or it may be filled out for him according to his answers to questions asked. Fig. 2 is an example of a quite complete application form; Fig. 3 is a very meager one, while Fig. 4 calls for about all the information that could be required. Table I shows the principal subjects about which information has been asked and recorded by employment departments. Of these, the necessity for some is obvious and for others, questionable. The data listed under the head Historical are nearly always required. Name and address, and shop number and department if the man is hired, are necessary.

Age, usually taken in terms of date of birth, is necessary in some states for all employes under 21 years of age. It may be that an age limit is set by the shop for some or all departments. It is always desirable from a statistical point of view to know whether the average age of the employes of a shop is becoming too high. Old men are useful; but the very fact of their age necessarily implies that younger men should be in training to take their places when the inevitable time comes for them to retire from active work.

*Industrial history* as given by the man himself is always subject to suspicion; but the writer has had an opportunity to see many thousands of industrial histories thus given, which could be checked up with the histories which they gave to other people in distant camps, and the discrepancies were very few and easily to be accounted for by the lack of knowledge of the trades and industries on the part of the interviewers. These industrial histories are of value for two things: one is, they show the kind of shops in which the man has worked; and from the time which he worked in each a pretty shrewd guess may be made at the length of time he is likely to stay in the next shop. In connection with the industrial history, it is perfectly natural to inquire why the man left each job; and answers to this question give a very good idea of his reactions to the ways of the shops. For example, if he has found the work in one shop too hard, in the next too exact-



ILT 289 8 2

# APPLICATION FOR POSITION

## WITH

### THE THOMAS A. EDISON INTERESTS

#### ADDRESS-ORANGE, N. J.

YOUR NAME ? ..... (IN FULL) ..... 125 KODAK SAFETY FILM

WHAT HAS BEEN YOUR PERMANENT ADDRESS ? .....

SINCE WHEN ? ..... CAN YOU ARRANGE TO LIVE NEAR YOUR EMPLOYMENT ? ..... HOW CAN YOU ARRANGE IT ? .....

WHERE CAN LETTERS REACH YOU NOW ? ..... AT WHAT HOURS ? .....

WHAT TELEPHONE NUMBER WILL REACH YOU DURING THE DAY ? ..... DURING THE EVENING ? .....

IF WE SHOULD WISH TO TELEGRAPH HOW SHOULD WE ADDRESS YOU ? .....

DO YOU BOARD OR KEEP HOUSE ? ..... OWN OR RENT YOUR HOME ? .....

DO YOU BOARD WITH RELATIVES ? ..... OR WITH STRANGERS ? ..... OR LIVE AT FAMILY HOME WITHOUT FINANCIAL RESPONSIBILITY ? .....

WHERE WERE YOU BORN ? ..... WHEN ? .....

IF OF FOREIGN BIRTH, WHEN DID YOU COME TO THE UNITED STATES ? ..... WHEN DID YOUR FATHER COME ? ..... IS HE A U. S. CITIZEN ? .....

IF YOU HAVE NATURALIZED, WHEN DID YOU SIGN YOUR FIRST PAPERS ? ..... SECOND PAPERS ? .....

WHAT WAS YOUR FATHER'S NATIONALITY ? ..... YOUR MOTHER'S ? .....

YOUR FATHER'S NAME ? ..... HIS BUSINESS ? .....

IF LIVING, HIS PRESENT ADDRESS ? .....

ARE YOU SINGLE ? ..... MARRIED ? ..... WIDOW ? ..... WIDOWER ? .....

HOW MANY CHILDREN OF YOUR OWN DEPENDENT UPON YOU ? ..... ADOPTED ? ..... OTHER RELATIVES DEPENDENT ON YOU ? .....

WHAT IS YOUR HEIGHT ? ..... YOUR WEIGHT ? ..... GENERAL CONDITION OF YOUR HEALTH ? .....

IF YOU HAVE ANY DEFECTS OF SIGHT, HEARING, SPEECH OR LIMBS, OR SUFFER FROM ANY INJURY, PLEASE STATE PARTICULARS .....

IF YOU HAVE LOST TIME THROUGH ILLNESS DURING THE PAST FIVE YEARS, PLEASE STATE THE NATURE OF THE ILLNESS, OR ILLNESSES, AND THE TIME LOST .....

FROM ..... TO .....

FROM ..... TO .....

IF YOU WERE EVER IN MILITARY OR NAVAL SERVICE, PLEASE STATE WHAT SERVICE ? .....

WHERE ? ..... WHEN ? ..... ATTAINED WHAT RANK ? .....

ARE YOU NOW A MEMBER OF THE NAVAL MILITIA ? ..... HDQRS. ? ..... ? .....

THE NATIONAL GUARD ? ..... ? ..... ? .....

THE NAVAL RESERVE ? ..... ? ..... ? .....

THE MILITARY RESERVE ? ..... ? ..... ? .....

IF YOU HAVE EVER BEEN ARRESTED, PLEASE STATE WHEN ? ..... WHERE ? .....

WHY ? .....

ARE YOU IN COMFORTABLE FINANCIAL CIRCUMSTANCES ? ..... HOW ARE YOU INSURED ? .....

WHAT IS YOUR RELIGION ? ..... PLEASE NAME ALL THE LODGES AND FRATERNAL SOCIETIES OF WHICH YOU ARE A MEMBER ? .....

SOCIAL CLUBS ? ..... OFFICES HELD ? .....

**TABLE I**  
**SUBJECTS ABOUT WHICH QUESTIONS ARE ASKED**  
**APPLICANTS FOR EMPLOYMENT**

Historical	Statistical	Checks
Name	Name	Name
Address	Address	Address
Shop number and department	Home address	Date of birth
Date of birth	Date of birth	Industrial history (complete)
Industrial history (3 or more jobs)	Industrial history (3 or more jobs)	Date of completion of school
Extent of education	Educational history	Desire to improve self
Nationality	Birthplace	Stability
Citizenship	of father	Sobriety
Married	of mother	Personal appearance
References	Citizenship	Courtesy
	First papers	Recreations
	Second papers	Hobbies
	Married	Avocations
	Single	Reading
	Divorced	Willingness to work
	Widower	Knowledge of work
	Children	Activity
	Number	Initiative
	Age	Loyalty
	Sex	
	Working	
	Other dependents	
	Memberships	
	Company organizations	
	Unions	
	Societies	
	Political party	
	Church	
	Army	
	Veteran	

ing, and in the third the management were too particular as to what time he got in in the morning, it is wise to beware of his tendency to take life easy.

*Extent of education*, while it may not have a bearing on the man's ability to do many different jobs, is important now that

a practical interest is being taken in the Americanization of employes of foreign birth. Facts as to education also are required in many cases where it is necessary to provide school certificates for employes under 21 years of age. Of course in case of expert accountants, laboratory employes, draftsmen, engineers, etc., education is a necessary part of their qualifications.

*Nationality* is often rather difficult to find out, and is better determined in the manner indicated in the column headed Statistical, where the birthplace of the candidate and that of his father and his mother are requested. So many people are legally Americans, that the question as to nationality answered literally does not assist much in deciding what national proclivities and idiosyncrasies to watch out for.

Whether a man is a *citizen* or not, is of interest to every shop that wishes to make America safe for all of us. It is really wise to see that the alien employes are sufficiently scattered in the shops so that they will have to become Americanized. In fact, this very scattering of aliens where they must learn English or not be able to get on, may prove an even more effective method of Americanization than the evening schools for foreigners, of which so many have been started in recent years.

The *married man* is preferred by nearly all employers, as the result of long experience. This preference is partly based on the selfish knowledge that a married man will put up with a great deal more than a single man without dependents before he will quit; which may be put another way, that the married man is much more sensible and less likely to fly off and quit in a temper than is the single man. Both ways of stating the case mean exactly the same thing. In a way, it is not any part of the shop's business whether a man is married, single, divorced, or widowed, nor how many dependents he may have; but in any state where there are workmen's compensation laws, it is possible that at some time or other it will be advantageous to have that information. The fact that a man has been married and is now divorced is not likely to make him either a better or poorer workman; but the fact

that the divorce has left him with the necessity of hiring a housekeeper to take care of his children may have a great influence on his stability.

*References* are a point over which there is great room for disagreement. If former employers could be depended on to tell the truth, or to have the truth to tell regarding their workmen, there would be no doubt but that references should be required and looked up. Employers are, however, very much inclined to play safe and answer inquiries concerning former employes by stating only that they did work there on certain work and that they left of their own accord or that they were discharged. This is really about all that is safe to say; because if a workman is prevented from getting another position through any statement which has any false color there may be serious consequences to the maker of the statement.

**21.** The questions so far discussed include those almost always required. They are, as stated, really historical, but they afford considerable ground for judgment as to the caliber of the candidate.

Under the group headed Statistical, in Table I, are included other subjects for inquiry, the nature of which is such as to make them useful in summarizing the state of the force at any time. In addition to those given under Historical, there is the *home address* when it is different from the local one. This is of value in case of men who have moved to town and left their families behind until they find out how they like the new job, in the case of young men who are working at a distance from their parents, and such other wanderers as have only partly taken root in the city.

For statistical purposes, it is desirable that the *educational history* be given in more detail than just enough to determine the extent of the candidate's acquirements. This is particularly desirable in the case of office employes who are offering evidence of graduation from commercial schools, as after a time these histories furnish a means for judging of the relative merits of the schools as preparatory to work.

Another subject found in the Statistical column, in addition to those already discussed, is *memberships*; this is also a matter for serious consideration. So far as memberships in things officially connected with the company are concerned, there is no doubt that the record may well be kept in the employment department. Among these memberships are included those in agricultural societies, ball clubs, canoe clubs, eating clubs, mutual benefit associations, etc.; but when the question is raised regarding church and political affiliations and membership in unions, it seems futile to ask the questions, as so few men will feel themselves in any way bound to answer truthfully if at all. Of course, if a shop hires only union men, the question is eminently proper; but if the shop is a so-called open shop it creates a suspicion that it is really a shop closed against the unions if this question is asked of candidates.

**22.** Under the heading Checks, in the third column of Table I, are listed things which become a check on the interviewer, either for his own use, if he is conscientious, or for the occasional use of his superiors. Whatever method of selection may be used, there is little doubt that final selection is usually based pretty largely on personal impressions. These personal impressions may be made at first sight, and too commonly are of that hasty kind. Before anything definite is determined, however, the interviewer ought to satisfy himself as to the whole of the applicant's past history so far as it can have any bearing on his future. There is always the possibility that, even when a man applies for a given definite job, he may be a profitable man to employ in some place of which he never heard. For this reason, the interviewer should inquire into all the applicant's past jobs, as well as the few that are recorded on the application blank.

There are men who have never had more than two or three jobs, but they are extraordinary exceptions to the rule. It is safe to say that at least 90 per cent. of all applicants have had more than four jobs; though, now that so much more employment-management work is being done, they are becoming more canny about telling of any except those that sound well.



For this reason, it is also well to get the man's age, and at another part of the interview the date of his birth and at another time his age when he left school. Many firms also require his reasons for leaving school; but the replies will almost always be, "To go to work," which is only a half truth, as most boys leave school because they do not fit the system. However, knowledge of that fact may almost be assumed. When the candidate has once stated his age and the time he left school, he should account for all the intervening time, even if some of it has been spent in jail, which may be by no means the worst place from which to hire some help.

**23. Qualities Desired in Employees.**—Employers are looking for certain things in all their workmen, office force, and executives. The man who hires these people has to do the best that he can to get those having the qualifications required. His methods may be very crude and he may fall far short of his or his employer's ideals, but nevertheless it is right that he should keep those ideals before him.

First of all, the employer does not want lazy men. He knows that he has them, and he is not going to discharge his employment manager because he hires more of them; but the employment manager will not hire them if he can help it. Willingness to work is therefore an essential.

The next thing in order of importance is the degree of intelligence possessed by the applicant. He must know how to do the work required or be able to learn. The ability to learn is of importance, since it is beginning to be realized that, especially in the skilled-labor class, a system of training employes is needed. There has been much trouble in shops from the slowing-down influence of imported mechanics and the tendency of those who pick up trades to pick up many bad traits at the same time. On this account, many employers believe that there is sufficient reason for going to the expense of deliberately training all skilled workers for the next generation, in trade schools away from the example of bad workmanship and unsettling propaganda. So knowledge of a trade or ability to learn easily is next in value.

Activity is something to be noted; not that all men should be chosen for their great activity, for there are many jobs in which a physically active man is out of place and on which he will stay only a short time. In shops, there are many jobs that are almost watchmen's jobs, where the workman simply stands around waiting for the machine to either do the work or go wrong. If there was not the danger that something might go wrong, he might go fishing until the stock ran out, but he is really hired for these emergencies. Fortunately, there are a great many men to whom such jobs appeal; but if they are put into active jobs, they are neither happy nor successful.

Certain jobs require the constant use of initiative, imagination, and horse sense; and the employment interviewer needs to be constantly on the lookout for men having these qualities, as it is usually possible to move some other man from such a job in the shop in order to take in one who really has these characteristics.

24. Some jobs require a good personality; others require a man who dresses neatly and who looks well in any kind of clothes. For example, a demonstrator must be able to put on overalls without losing his prestige with the general manager. Men who cannot do this may be very fine demonstrators, but the customer may have made up his mind adversely before he discovers that that particular demonstrator knows what he is talking about.

Sobriety still remains an important factor to be considered, and to all appearances it will for some time, regardless of the eighteenth amendment. It is easy to ask the medical department to determine as to the man's sobriety when they are making the physical examination; but they will probably not admit their ability to judge of it any better than the employment man. The way the question in regard to sobriety is put to a man makes all the difference in the world as to the answer he will give. Most men see nothing immoral about lying as to their purely personal affairs, and no one admits that he drinks enough to affect his work.

**25.** For many positions in the office, and particularly in the case of men who are applying for jobs for which they will have to be trained, such as recent graduates from school, it is helpful to know what proclivities they have shown in their recreation. A man's avocation may very well be something which he should develop and turn to for a life work. Perhaps he has always wanted to be a photographer, but never had the courage to try it. He may only need a little encouragement. A man who is a mediocre machinist may have a hobby for photography and he may be able to do the work for which a professional is occasionally brought in; a man with a hobby for baseball or other sports may be able to organize shop sports better than a professional, for he can usually be brought to see that production is the aim of the shop as a whole.

If, at the time the man is hired, all these things are made a matter of record, as the impression which he has made on the interviewer, and if this card on which they are recorded is brought out at the time the man is a candidate for an increase in pay, or for promotion, or if he leaves, the employment manager soon gets to have a very good idea of how good a man his interviewer is, whether he is carried away by his likings for one nationality over another, and whether he lets a pretty face and attractive manners overrule his judgment when he is hiring girls. Every interviewer needs just such supervision, even if he has to supervise himself, for every one is likely to wear ruts to travel in unless he is very careful.

**26. Place of Interview.**—If it is possible to plan the place where the interview is to take place, it should be so located as to be easily found by applicants. It should be on the ground floor and only a step to the sidewalk. While it is desirable that it be centrally located so far as the shop is concerned, it is more important that it be handy to the stranger who is coming for a job the first time. None of the other functions which the employe-relations department has to perform can overshadow this necessity. Of course there are times when men will hunt for a job no matter whether there is an employment office or not and no matter where it is

located; but that is just the time when the employment office has the least to offer and when the shop is making the least money. It is safe to say that, whenever there is business enough for profitable operation of the plant, there is a scarcity of help of the desirable kind. In fact, most personnel offices are organized only under pressure of need for help.

An office on the second floor is only slightly less objectionable than an office in the basement. The latter is the worst, because of the psychological effect on the incoming applicant, the rest of the force, the employes of the personnel office, and the management. This is because anything which is relegated to the basement is understood, wrongly perhaps—but nevertheless it is so understood—to be out of favor with the management. Any one who is asked to apply in or to work in a basement has a feeling that the basement is a dumping place for things undesirable no matter how necessary. If the employment department is regarded as a necessary evil, it should be abolished long enough to determine whether it is needed or not; if it is found necessary, it should be brought up to a level where it will command the services of men who will not accept a job in the cellar.

**27. Reception of Applicants.**—Unless the shop is very specialized it will require the services of a great variety of employes. However, this is a democracy and the most undesirable man is entitled to comfort while he is waiting for a reply to his request, and he is entitled to as prompt a reply as possible. The practice in the old days when a man wandered into the shop and spoke to the first man he saw and asked for the boss and got his answer in two minutes, had at least the merit of promptness and comfort. When this privilege is taken away, it is necessary to provide a suitable place for men to stay until all the different foremen who may need his services can be called up on the telephone or until the requisitions which they have sent in can be looked over. All that is required is a perfectly plain, clean room with good ventilation, and heat enough so that the ventilation can be kept up in cold weather. Smoking is not usually allowed;

but, no matter what the kind of tobacco, it seems preferable to the body odors which can accumulate from some of our coming citizens. There should be chairs or settees, preferably folding, so they may be gotten well out of the way for cleaning. A floor of concrete, which can be washed down with a hose, is an advantage, as such a room should be cleaned regularly, otherwise the applicants will lose all self-restraint. There are only a few men who will make the first move to defile a room, but there are a great many who will follow examples.

In some places where there are large numbers of applicants, it is customary to hand each man a numbered check as he comes in, and then to call them to the interviewer's desk in the order of their numbers. This is a fairer way than to call for all the blacksmiths, or all the laborers, or, as the writer heard once, all the Swedes. If, however, a man is required in some trade that is not usual in that shop, as, for an example, a mason in a corset shop, then it may be admissible to make inquiry of the whole crowd as to whether there is a mason present or if any one knows a mason who can be obtained.

Where large numbers of people are handled, it is customary to have a very brief preliminary interview and to admit to an inner waiting room such persons as are to be more carefully talked to for present or future employment. This inner waiting room can be subdivided into as many parts as there are interviewers; and by sending all applicants of one class to one interviewer and those of another class to another, and so on, the applicants can be separated so that those of refinement will be much better situated. There is also the additional advantage that the interviewers can be selected for their acquaintance with different kinds of work and thus become experts in the selection of men for different parts of the shop.

**28. Interview Rooms.**—The practice of having separate rooms for each interviewer with a waiting room for each, is growing in favor over the cheaper plan of having all

interviewers at desks in the same room. Much of what is said between applicant and interviewer is confidential and should not be made public property. This applies both to personal history and to the offer of employment made to the successful candidate. Unless the company makes a definite practice of paying a certain beginning rate to every one taken on for a given job, it is advantageous to have the rate actually paid in individual cases kept confidential. If the next man in line overhears an offer being made that he considers too low, he may not stay for an interview at all; while if he hears one that is higher than he intended to ask, he may demand the same, without regard to his lack of experience as compared with the other man.

If the small room is used, it need only be separated from the others by low partitions, as it is the sense of privacy only that is needed. The lighting should be good, but not glaring, and should fall full on the applicant. The first response to questions is usually through the facial muscles. Intelligence appears often through the eyes, so that much more can be learned about a man by looking at him, than by merely taking down his answers. The equipment is most simple. A table on which to make out the necessary application blank, and two chairs, are sufficient, unless occasionally another chair is needed for an interpreter. It is best, however, not to encourage men in bringing in their friends to talk for them, as this does not help the interviewer to come to any logical conclusion.

**29. Functions of the Interviewer.**—There is a variety of practice as to the functions of the interviewer. In some cases the man is really hired before he meets this official, in which case the interviewer becomes merely a clerk to secure certain information for the records. In other instances the interviewer makes recommendations to some one individual that a certain man be hired, and that person makes the final decision after looking over the application blank. In this case, the interviewer soon learns how to play up the application to secure the applicant a job and how to write it so that



he will be turned down. In most places, however, the interviewer is the man who settles the whole matter. This seems better, if for no other reason than that the applicant does not find himself passed from hand to hand, but can deal with one man all the way through.

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#### PHYSICAL EXAMINATIONS

**30. Purpose of Examinations.**—The number of shops at which physical examinations of all applicants for work are required is increasing. The true purpose of such examinations is to enable the employment department to place men where they will be most effective and where their working lives will be lengthened rather than shortened by the work. These examinations have accomplished another thing that is of at least equal value; and that is, they have brought to notice the harmful things in the shops and processes of the company and have often secured their removal or their improvement. The fact that many of the men who are high up in the industries of today worked in shops themselves under any but good conditions, tends to blind them to the shortcomings of their own management when the humanitarian side of it is presented to them. The word of a physician, however, makes a much greater impression on such men than does that of any layman.

The physical examination should be sufficiently thorough to discover any trouble that might cut down production or injure the man if he should keep steadily at the proposed work for a considerable period. A very concise but full form for recording a medical examination is shown in Fig. 5.

**31. Place for Examinations.**—It is very desirable that the physical examinations be conducted close by the interviewers' rooms, as the doctor and the interviewer should very often wish to confer informally, rather than by written report. The doctor should, however, certify on the record that the candidate may safely work at the job offered him unless the man is in so good condition that he can certify him for any job.

From the doctor's point of view it is desirable that the examination room be close to the infirmary and hospital where accident and illness cases are taken care of. If it is not, there will be delays in getting examinations made, and delays in getting the other work attended to. Similar conditions apply to the location of both the hospital and the employment office, though the hospital can be on a floor higher up if there is an elevator handy for patients who cannot walk to the hospital. The hospital has still more need of light and air than has the employment department, so an arrangement by which the hospital is over the employment room works out well. The equipment needed is quite simple. For treatment of the great majority of accidents and illnesses, a small glass-top table and a chair are all that can be used. It is seldom that a shop is so situated that an operating table is needed. A small room with a bed on which a patient may rest after treatment and care is desirable, though very seldom needed. Industries that are likely to have many eye cases may profitably have a dark room for removal of foreign bodies in the eye. Apparatus for sterilizing instruments, bandages, etc., is necessary. The physical-examination rooms require booths for dressing rooms, scales for weighing the candidate, and the usual eye-test charts. Apparatus for testing blood pressure is usually carried by physicians, but may be provided by the company.

**32. Possible Disabilities.**—Many works managers will say that there is no need for these physical examinations, on the ground that in their long experience they have never found it necessary, and that they can tell whether a man is sick or not just as well as the doctor. For that reason, it may be desirable to remind such managers of some of the things that may have a great influence on a man's work, which are not usually noticed by a layman. For example, a man may have had at some time a blow on the head, which has left no visible mark, and yet it may have left him in such condition that he cannot, or ought not, go on a staging or any high place. Years ago such men were called cowards and were dared to go up, until they went and fell and were badly hurt. Examination


THOMAS A. FISON INDUSTRIES PHYSICAL EXAMINATION RECORD OF										SEX { MALE FEMALE	
											
NO. _____		DATE _____		_____		_____		_____		SINGLE MARRIED WIDOW-ER	
HEIGHT _____ FT.		IN. WEIGHT _____ LBS.		UNDER 1 OVER 1		SPECIAL COMMENT :					
EYES _____		O. D. _____ O. S. _____		WITH GLASSES O. D. _____ O. S. _____							
HEART: _____		_____		_____							
_____		_____		_____							
TEETH: { NUMBER MISSING X		UPPER-8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8		RIGHT		LEFT		I NOW HAVE _____ ENLARGED INGUINAL RINGS AND THEREFORE HAVE A PREDISPOSITION TO HERNIA. IN CASE AN INGUINAL HERNIA EITHER SINGLE OR DOUBLE—SHOULD DEVELOP DURING THE TERM OF MY EMPLOYMENT I WILL NOT HOLD THE _____ EITHER TEMPORARY OR PERMANENT LIABILITY FOR ANY COMPENSATION OR BENEFITS UNDER THE NEW JERSEY WORKMEN'S COMPENSATION ACT OR AMENDMENTS THERE TO.			
NUMBER DECAYED O		LOWER-8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8		ULCERATIONS _____		TONSILS _____					
EXTENSIVE DENTISTRY _____		_____		_____		_____					
EARS- R. _____ FT. _____ IN. _____		L. _____ FT. _____ IN. _____		_____		_____					
GENERAL APPEARANCE : _____											
ROBUST _____		PALLID _____		ANAEMIC _____		WEAK _____		STRONG _____		SIGNATURE _____	
_____		_____		_____		_____		_____		EXAMINER _____	
_____		_____		_____		_____		_____		APPROVED BY _____	
_____		_____		_____		_____		_____		M. D. _____	

Fig. 5 (Front)

EYES:	COLOR BLIND	EYE DISEASES
SUBJECT TO HEADACHE:		
LUNGS:	ABNORMAL PHYSICAL SIGNS:	
DIAGNOSIS:		
HEART:	BLOOD PRESSURE (SEE NOTE)	
APPENDICITIS:		
GENERAL APPEARANCE:	MALNUTRITION	DEFORMITIES
	GLANDS	PARASITES
HABITS AS TO ALCOHOL:	TOBACCO:	
HABITS AS TO OTHER FORMS OF STIMULISM:		
SKIN AND MUCOUS MEMBRANE:		
LOSS OF HAIR GENERAL OR LOCAL:		
NOSE:	OBSTRUCTED BREATHING CAUSED BY:	
DEFORMITIES:		
NERVOUS SYSTEM:	LOCAL PARALYSIS	EPILEPSY
	NEURALGIA	ST. VITUS DANCE
DISEASE OF NERVOUS SYSTEM:		
SUBJECT TO HEADACHES:	SLEEP:	WELL POORLY
EXTREMITIES:	DEFORMITIES	VARIKOSE VEINS
HISTORY OF DISLOCATION:		
FLAT FEET	STIFF JOINTS	
EVIDENCE OF ACTIVE VENEREAL DISEASE:		
SPECIAL COMMENT:		

FIG. 5 (Back)

would show that these men are not malingering, and they may be efficient in positions for which their disability does not unfit them.

**33.** Some of the common disabilities, which are more or less noticeable, are as follows:

Many men have defective eyesight and do not know it. Men have been totally blind in one eye and never happened to discover it. There are diseases of the retina and the optic nerve that are not correctible by glasses. The layman cannot discover these things, but the examining physician will send the man to an oculist who can definitely determine whether anything can be done or whether the man will have to be assigned to some work requiring limited capacity.

Men sometimes have trouble from two little pockets in the head just above and each side of the nose, causing intense headache for which none of the ordinary remedies produce relief. The pain is so intense that the victim cannot do even the most ordinary work efficiently. A comparatively simple operation will cure or greatly relieve the situation. Most nose troubles are easily relieved, but if they continue to exist they bar a man from comfortably working where there is dust.

Deafness is no bar to many trades, in fact a man may do all the more work because of the lack of distraction. However, no deaf man should be employed where there are dangers of which he could not hear a warning; as, for example, working under a traveling crane or on a staging around a building where some one might knock him off by swinging the end of a stick of timber around, unless he heard the warning yell. Similar dangerous conditions for a deaf man exist in a dye house or tannery around vats containing hot liquid, in a steel mill around the rolls, and so on.

Likewise, a man with a stiff neck, so that he cannot look upwards, should not work under a traveling crane, and he cannot do plastering or any of the jobs that require reaching over his head and seeing what he is doing there.

**34.** The most common accidents are those to the fingers. Fortunately the considerable number of fingers with which

we are endowed makes it possible to do quite a number of jobs even with two or three missing. The forefinger on the right hand, if the man is right handed, and the thumbs on either hand, are the most necessary for most skilled work. Because the thumb is so much shorter than the other fingers, it is not nearly so likely to be injured, and consequently fewer men lose their jobs on account of injury to it.

Finger and thumb injuries are apt to require amputation, in whole or part; the more difficult ones are smashed members which the owner does not want amputated, but which often become stiff or the broken bones knit together in a bent position and get in the way. It is the man's prerogative to go through life with a useless finger, or one worse than useless because it is unsightly and in the way. If he does not want it removed, it is necessary for him to take work that he can do in spite of it. Most hand, arm, and wrist injuries are as evident to a layman as to the doctor; but it is not always apparent to those in charge that these men can do some things around almost any shop by the assistance of a little rearrangement of the work.

**35.** A man may have flat feet which cause him such pain that he cannot do work to advantage. He may know how to do it, and he may take the job in all good faith that he can and will put up with the discomfort; but if his feet are very flat, he will almost surely give it up in a short time and simply swell the labor turnover, unless he can sit and get his weight off his feet a considerable part of the time. The medical department will prescribe proper plates to be worn in the shoes, if the case is not too far advanced; but even these and constant strapping do not give relief in bad cases.

Injuries to the toes are apt to be lightly thought of by the layman, who looks on toes as mere dwarfed fingers and of no use; but a man who has lost his large toe has lost his support in walking, and is uncertain in his movements. He should not be employed where his ability to balance is of importance.

**36.** Hernias are dangerous unless cured by operation, which is usually simple and safe; however, many men prefer



to wear a truss, which is unsafe, because the truss, if worn in such a way as to be of any value, is uncomfortable, so they are apt to loosen it, especially in hot weather. Such men should not be employed where there is lifting of much weight even in emergencies. They are safer where lifting is constantly required than where it is necessary only in emergency; for where lifting is a part of the job they realize the need of self-protection, but under other conditions they get careless.

Old appendicitis operations apparently do not bar a man if the wound of operation is well healed, and if there are no adhesions of the intestines. If there are, the man may look just as well as he ever did and yet not be able to do work requiring much motion of that part of the body, since motion causes pain which can only be borne for a time.

Stomachaches are usually lightly passed over, but a man with a history of repeated attacks should be looked over carefully for hidden ulcers or cancers. He may need work, but he cannot continue at it long; and he should put himself in a position to be cured, if possible, rather than have his trouble aggravated by taking up active work.

**37.** The greatest single enemy which the layman cannot detect until late is tuberculosis. This is especially dangerous, because it is communicable and one man may injure many others if he does not know that he has this malady or if he does not follow the rules closely. The only right place for sufferers who are in the active stages of the disease is in a sanatorium or at home under competent advice. After their trouble is arrested, they should not do any work that requires strenuous motion of the arms and upper part of the body, because it may break down the wall which has been built up in the lungs to separate the diseased portion from the well. A man who has been through the long struggle to keep the disease in bounds should not be subject to the orders of some foreman ignorant of the effects and who may insist that a man take hold and help for a few minutes at some task that will cause him months if not years of effort to counterbalance. It really seems that in a large shop some special employment

should be assigned to employes in whom tuberculosis has been arrested, and this should be under the care of some foreman who knows thoroughly just what such persons should do and not do, preferably a past victim of the disease himself. In many shops the idea of having either past or present tubercular cases at work is abhorred; and yet, without a thorough medical examination, both forms of cases may be present without proper precautions for either. Barring men from employment because of their past sickness is neither economic nor humane. Such men need work, not only to support themselves but to keep them well mentally as well as physically. They should not be shunned; but while in the active stages they should observe the usual sanatorium regulations just as much at home as elsewhere. The old idea that those recovering from tuberculosis must have a light outdoor job is no longer in good favor; for there are few jobs of that kind, and such persons need to be sheltered from the inclemencies of the weather. They need fresh air and plenty of it, but they need no more than the rest of us do for our own good health.

Bronchitis is a much more common ailment than it was before the World War. Nearly every one had a susceptibility for it, but it took the gassing which so many soldiers experienced to make it a real disability. These men were to all appearances cured before they were discharged, but they were cured under good conditions of ventilation. They had become so accustomed to outdoor life that they found it very hard to get back to their homes and find every "draft" shut out for fear that some one would catch cold. The result of being so closely housed was that they soon became very susceptible to colds, and these colds developed into really bad cases of bronchitis, which, in turn, lowered the vitality of so many that the tubercular germs could become active. Gas probably did not convey tuberculosis but merely acted to make the patient less resistant. For this reason the medical department of every shop owes it to the community to keep close watch of every soldier who was abroad, and those that were in the experimental work in this country and see that they

work under conditions conducive to good health, for that is the one thing necessary to oppose the germ of tuberculosis.

38. Heart trouble is sometimes visible to a layman, but it is more often that the symptoms which he takes for heart disease arise from lung or stomach troubles. However, there are a great many men with heart disease who will outlive others with perfectly sound hearts, and earn a living nevertheless. In at least one hospital, a baseball team went through the whole season with players every one of whom was under treatment for some kind of heart disease, without slowing down the cure of any of them. It is very necessary that these cases be seen at regular intervals by a competent physician, and that the regulations as to the exercise and work which the men may take be rigorously followed. There is no reason for debarring a great many of these men from useful work, and their cure is much more rapid if they are given the substantial encouragement of a job.

Teeth are of course observable by a layman, but he is not apt to look on a few decayed teeth as any hindrance to a man's efficiency in the shop. Yet a man with bad teeth needs more time to masticate his food, and if they are accompanied with abscesses at the roots, he is likely to have rheumatism. If he does not take the extra time to chew his food thoroughly, a larger burden is thrown on his intestines than they should have and he is liable to all sorts of trouble, which keeps him on the sick list when he might otherwise be earning his living. Probably more has been said about the effect of bad teeth than should be, for many people have had their teeth extracted in hopes of curing ailments that existed only in their own imaginations, or that could be relieved by fresh air and proper food.

One of the favorite troubles that workmen have, especially since the advent of workmen's compensation laws, is a sacroiliac strain, otherwise a backache. Whether or not they have this, is not easily determined by the layman and not much more certainly by the doctor. If a man asserts that he has such a strain, about all that can be done is to believe him, unless he forgets himself and bends over suddenly without

signs of pain. If he really has a serious limitation of motion in his back he is quite likely to have rheumatism. There is also a chance that some fall, regarded as insignificant at the time, may have cracked some one of the little points on the vertebræ to which the muscles are attached. That is, it is not safe to treat any case of alleged backache as malingering, without looking into all the possible ways in which the patient may have been injured

**39. The Industrial Physician.**—There have not been very many positions for industrial surgeons which are attractive from the point of view of a medical man. A doctor always has hopes of a large and fashionable, not to say profitable, practice. As a young man without experience, he does not see anything in industrial work to lead him to this kind of practice, since it brings him in contact mostly with the kind of patients to whom his minimum charge would be a burden. As he grows older, he either gets his hope and has a large and profitable practice, which he could not possibly afford to give up for any industrial job, or else he does not get it, and the world and himself count him a failure. He is then willing to take an industrial job, but there are no openings for him.

The result is that the few men who do go into industrial surgery are those who are imbued with the missionary spirit and who are willing to make the sacrifice for the sake of the good they can do. When more and more shops see the need and profit in this work, there will undoubtedly come a recognition of the value of the medical man's services, and doctors will be paid for keeping the shop population well instead of on the basis of curing the sick. That is, preventive medicine which is a misnomer because it uses almost no medicine, will take the place of pills for ailments. If a good medical department can reduce the amount of absence from the shop from 5 per cent. to 3 per cent., for example, and the pay roll is \$5,000,000 a year, then \$100,000 is added to the working pay roll. If the firm makes a 10 per cent. profit on the work of its employes, then the department has saved \$10,000, an amount that would be attractive to many excellent surgeons.

## RELATIONS OF EMPLOYMENT DEPARTMENT TO THOSE EMPLOYED

**40. Approval of Hiring.**—Custom varies in different places as to whether the employment manager shall hire the workmen or whether the foreman shall do it. In the latter case, the applicant might be sent to the foreman with a slip such as that shown in Fig. 6, which would serve as a letter of

16G-5M-3-19 Old No. 1694		<b>PERSONNEL SERVICE DEPT.</b>		NO. _____	
<b>INTERVIEW</b> _____				DATE _____	
OF (TOWN OR CITY) _____				TIME _____	
FOR POSITION AS _____				WORKING NOW? _____	
RECEIVED CARD _____		} APPOINTMENT HOUR _____		ARRIVED _____	
" LETTER _____					
PHONED _____					
OWN ACCORD _____		RECOMMENDED BY _____			
INTERESTED THRU _____		(FRIEND, AGENCY, AD, ETC.) _____			
INDEXES OF CARDS GIVEN _____					

FIG. 6

introduction. One object of employment work is to take the hit-or-miss method of hiring out of the hands of the foremen and standardize it. The question arises, shall the foreman be consulted or shall the employment department merely send him men according to his requisitions and tell him to do the best he can with them? This is not a single-sided question by any means. The average man looks on the person who gets him or gives him a job as a friend. If he thinks the foreman does the hiring, the foreman is his friend, and the man will try to please him. If he thinks the employment department selected him, he may have a feeling of contempt for the foreman who subserviently took him on. The best way is to have the employe understand that both the employment department and the foreman had an equal share in hiring him

# PERSONNEL REQUISITION SHOP POSITION

THE THOMAS A. EDISON INDUSTRIES  
VOID AFTER 21 DAYS

DEPARTMENT \_\_\_\_\_ DIVISION \_\_\_\_\_ 192

TO PERSONNEL SERVICE DEPARTMENT:

{ START WORK \_\_\_\_\_ 192

PLEASE FURNISH THE FOLLOWING TO { INCREASE FORCE

{ REPLACE. CHECK NO. \_\_\_\_\_ NAME \_\_\_\_\_

ALWAYS SHOW WHETHER INCREASE IN FORCE OR REPLACEMENT

NUMBER	DATE	REASON	POSITION	NOTES

CHECK, OR ADD WORDS FITTING YOUR NEEDS

## NATURE OF WORK

PERMANENT	DAY	HEAVY
TEMPORARY	NIGHT	LIGHT
TIME WORK	STANDING	FINE
PIECE WORK	SITTING	COARSE
ALTERNATE	OR BOTH	
BONUS		

## QUALIFICATIONS PREFERRED

AGE	READ	HANDS COARSE
NATIVITY	WRITE	HANDS MEDIUM
TALL	OR NEITHER	HANDS DELICATE
MEDIUM	GLASSES, YES	RIGHT HANDED
SHORT	GLASSES, NO	LEFT HANDED

OTHER POINTS \_\_\_\_\_

APPROVED

APPROVED

SIGNED

FOREMAN.

AFTER NECESSARY APPROVALS HAVE BEEN SECURED SEND TO PERSONNEL SERVICE DEPARTMENT



and he should not be allowed to forget that both parties know that he is there.

This can be accomplished without friction, if the employment department offers its men as candidates only, subject to the approval of the foreman. In that case, the employee realizes that he would not have reached the foreman except through the approval of the employment department, and he also realizes that the approval of the foreman makes the latter an equal factor in the matter. There is really no loss in prerogative for either; and if it is necessary for both to agree

Form 9-8 (600007)  
64925-Z

**Newport News Shipbuilding and Dry Dock Company**  
**EMPLOYMENT REQUISITION**

EMPLOYMENT AGENT: \_\_\_\_\_ Date \_\_\_\_\_ 191

PLEASE ARRANGE TO <sup>employ</sup> <sub>transfer</sub> THE FOLLOWING HELP

FOR ..... DEPT. TO TAKE EFFECT ..... 191

No. Persons	Nature of Work	Rate	P. W. May Average	White or Colored

If this is for temporary work give probable length of service required ... ..

Foreman.

FIG. 8

on the men, there is a better chance of a good selection. The one exception to this is in the case of men who apply at the instance of the foreman and are not approved by the employment department. This is, however, as it should be; for a foreman should never be allowed to hire his own personal friends without some check. There is all too much chance that the employment department will wink at these selections and let the man in without much regard to his merits in order to make it easier to get other and corresponding favors.

Where help is hired by the employment department, the foremen usually make requisitions on that department by use of forms like those shown in Figs. 7 and 8.

**41. Identification of Workmen.**—When a man is once hired it is necessary to get him on the pay roll, and to give him some means of identification so that the paymaster may give him the proper envelope. This is not necessarily a function of the employment department, but that department is often found to be the easiest place through which to make this identification. The means of accomplishing this identification range from the commonly used brass check to the elaborate schemes of photographs and thumb prints used during war as a means of identifying the employe and of guarding against spies.

The brass check is effective and simple. Possession of the check gives the right to the week's pay. If the man loses the check, he is supposed to report the loss and get a new number and another check, then if the original check is presented there is prima-facie evidence of an attempt to defraud. The only danger is that the man who loses the check may not report it until after some other man has presented it and obtained the pay envelope, or the chance that some man with an unpronounceable name may decide to leave the shop and hand over his check to some relative or friend, and the shop thus may change help without being aware of it.

Cardboard passes, signed by the works manager or some high official, are usually the next step. They appear to offer only the advantage that they are not so easily imitated by men who wish to obtain access to the works. After the official has signed the first 500 by hand, however, he is likely to get a rubber stamp for the rest, and from then on he might as well not issue them at all. Photographs are the next resort, but any one can take a photograph. The fact that a man has his photograph on a pass signifies nothing; the question is, is it the photograph of the man it purports to be? One firm, at least, has handled this matter rather cleverly by having a small seal made with which each official photograph is impressed. This seal is not easily duplicated. By photographing the man's shop number with him on the same plate and then imprinting the seal partly over the number, the whole combination is pretty closely tied together. The photograph, however,

should be large enough so that the paymaster or the gateman, or whoever is to see it, can not help looking at it. This cuts out the postage-stamp size, or the motion-picture-film size.

Form 305		EMPLOYMENT RECORD	
No.	Engaged as	Date	
Name		Rate	
Address		Telephone No.	
Single	Married	No. of Children	Age
Total Experience		Nationality	
Last Employer		Address	
Date	Clock No.	Reason for Leaving	
Length of service		Last Wages Received	
Member of Union	Name	No.	
Drink	Chew	Smoke	
Ever Work here before	When	Shop	
Relatives in our employ			
Physical data		Impression	
Years Apprenticeship Served			
Under Whom			
Home Address			
Member Society	Name	OVER	

FIG. 9 (Front)

Rate Changed From	To	date
" "	" "	" "
" "	" "	" "
" "	" "	" "
" "	" "	" "
" "	" "	" "
Transferred to	Dept.--Date	
" "	"	
" "	"	
" "	"	
Quit	Reason	Date
Laid-off	Reason	Date
Discharged	Reason	Date
Remarks :		

FIG. 9 (Back)

Nothing much less than 2 inches by 3 inches will be a means of actual identification. One firm used photographs of this size showing both a full front view and a profile. This seems like a very elaborate precaution; but they were engaged in

very important war work and the extra feeling of safety was undoubtedly well worth all its cost.

If photographs are used, the proper time to take them is just after the man has been accepted by the employment department and approved by the medical department, and before he is taken to the shop. In the few cases in which he is rejected by the foreman, his photograph can be crossed from the list and the number assigned him be transferred to some other more fortunate man.

**42. Value and Use of Records.**—It is very desirable to have ready access to all the information that the shop has regarding every past and present employe. In every case of promotion, or of increase in pay, or lay-off, or accident, or even illness, there is need of immediate use of records. Between whiles, there is the need of keeping statistics, so as to be sure to maintain a proper balance of the various races among the help, and to be able to furnish the other vital statistics which are of constant use to the management.

The forms of records to be used will vary according to circumstances. Fig. 9 shows a small but comprehensive record card. Fig. 10 shows a form record that requires a minimum of writing. Part of this record is in the form of an application and much of the data can be indicated by check marks or by a single word. A record for use after a man is on the job is shown in Fig. 11. In Fig. 12 is a form for a yearly attendance record, and Fig. 13 shows the form for a severance of service card that is sent to the employment department when an employe is discharged or gives notice that he is to leave. This card gives the employment department a chance to review the case. A notice from the personnel department notifying the pay-roll department of the termination of the employe's connection is shown in Fig. 14. Fig. 15 is the form of a report that is an excellent precaution, as by it both the man and the foreman have their attention called to the necessity for instruction in safety.

Almost every employment manager starts his career by trying to develop a single card that will carry all the data

FIG. 10 (Front)

In the columns to the right draw **TWO LINES** under those occupations at which you are an expert; draw **ONE LINE** under those at which you have worked. After each underlined occupation write also the number of years (i.e. 1, 8, 5,) of experience you have had in that occupation.

If you have worked regularly at any other occupation not mentioned in these columns write it here:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Blacksmith  
Brass Foundryman  
Boiler Maker  
Carpenter  
Caulker  
Coppersmith  
Draftsman  
Dockman  
Electrician  
Engineer  
Electric Welder  
Foreman

Gas Cutter and Welder  
Steel Worker  
Bolter-Up  
Fitter  
Riveter  
Driller  
Holder-On  
Heater Boy  
Passer  
Puncher  
Countersinker  
Planer

Shearer  
Rolls  
Joiner  
Loftsman  
Laborer  
Machinist  
Class  
Painter  
Pattern Maker  
Pipefitter  
Rigger  
Storekeeper

EMPLOYMENT  
DATE ENTERED

DEPARTMENT

POSITION

DAILY WAGES

DATE LEAVING

REASONS

RATING

Very Good

Good

Average

Poor

Very Poor

Remarks

Appearance and manners ( ) ( ) ( ) ( ) ( )

General intelligence ( ) ( ) ( ) ( ) ( )

Reliability ( ) ( ) ( ) ( ) ( )

Ability to supervise men ( ) ( ) ( ) ( ) ( )

Best fitted for

Experienced ( ) Learner ( ) Laborer ( )

TERMINATION OF SERVICES: Date of Leaving \_\_\_\_\_ Reasons \_\_\_\_\_

Wages ( ) Hours ( ) Heavy, wet, dusty, etc. ( ) Housing ( ) Change of employment ( ) To what ( )

Insubordination ( ) Incompetence ( ) Intoxication ( ) Irregularity ( )

FIG. 10 (Back)



Surname		Given Name				Department		Rate
ADDRESS		Hour		Date	New Or Old	Dept.	Check No.	Date Rated
BEGAN WORK								
Age	Married Single	Children Under Age			Nationality			
Trade		Position						
Q	D	N	LO	Date Terminated	Date Last Worked	Memo.		
Transferred				Date				
TO DEPT.								
REMARKS								

# RECORD CARD-MERCHANT SHIPBUILDING CORPORATION

NOTE-When Employee is Transferred This Card Should be Forwarded With Duplicate Transfer (Form 252) to Next Receiving Dept. When Employee is Terminated This Card Should be Forwarded with Duplicate Termination Notice (Form 254) to Employment Office.

FIG. 11

NUMBER		ADDRESS																														
SHOP		YEAR																														
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January																																
February																																
March																																
April																																
May																																
June																																
July																																
August																																
September																																
October																																
November																																
December																																
NUMBER OF WORKING-DAYS		ATTENDANCE (PER CENT)																														
NUMBER OF ABSENT-DAYS																																

KEY:-- Symbols marked in the left half of a space indicate A, M.; in the right half--P. M.  
Days-- **BLACK INK.** Nights-- **RED INK.** Symbols signify as follows:

Unknown...AN...	TARDY...AL...	EARLY EXIT	H--HIRED
Excused...AX...		No work...AK...	T--TRANSFERRED
Sickness...AS...		Disciplined...AD...	F--FINISHED
No work...AK...			
Disciplined...AD...			

Norton Company; Worcester, Mass.

# REPORT ON EMPLOYEE

Name \_\_\_\_\_ Date \_\_\_\_\_ 191  
 No. \_\_\_\_\_ Assigned to Dept. \_\_\_\_\_ 191  
 Department \_\_\_\_\_ Will leave Dept. \_\_\_\_\_ 191  
 Cause of leaving \_\_\_\_\_

Signed \_\_\_\_\_ Dept. Head \_\_\_\_\_

Disposition of Case \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Amount Due	Signed _____	Employment _____
\$ _____ Week ending _____ 191	Noted	File _____ Hospital _____ Paymaster _____ Cost _____
\$ _____ Week ending _____ 191		
Approved _____	Employment Mgr. _____	
For Payment _____		

280.9.17-411

FIG. 13

required for each employee. He never succeeds, but sooner or later he either gives up the idea altogether or else he devotes an envelope, or folder, to each case.

The question then arises as to the value of keeping records. Many managers feel that, so far as the men actually on the pay roll are concerned, it is easier to go to them and get any desired information. When the question of increase in pay comes up, the pay roll itself may be consulted. If it is a matter concerning accident insurance or insurance of employes, ask the man or the insurance company. The advisability of

51G-25C-12-20 OLD 1804			
NOTICE FOR REMOVAL FROM		NAME _____	
PRIVATE PAYROLL	<input checked="" type="checkbox"/> CHECK	NAME NO. _____	
MANFG. PAYROLL	WHICH	ADDRESS _____	
THOMAS A. EDISON INDUSTRIES		DATE EFFECTIVE _____	
<input checked="" type="checkbox"/> SINGLE		PERSONNEL SERVICE DEPT NO. _____	
CHECK MARRIED			
WHICH HEAD OF FAMILY			
DEPARTMENT _____			
INDUSTRY _____			
		PERSONNEL SERVICE DEPARTMENT	

FIG. 14

keeping records and what shall be recorded are questions of profit and loss only. If records are never consulted and there is no legitimate reason why they should be consulted, they had best be left unkept. If the only thing taken into account when wages are readjusted is length of service and the last wage received, there is no need of consulting records in the employment office for such data. If all candidates for better jobs are drawn from outside the organization and no one inside is promoted except by favor, the records of the employment department have no value so far as promotion is concerned. If, on the other hand, men are treated in all respects on their records, then the records must be kept in such form

that they can be easily consulted. If the records of only one man in a hundred are consulted, it is cheaper to take similar records of all the men than it is to get that record in an emergency by going to the man or to other sources of information.

If all the data suggested in Art. 20 are kept for each man, the total cost of getting them is negligible. If, as will be explained later, follow-up work is done either in the shop or outside, there must be some report so that the proper action will be taken and so that the amount of follow-up work will be known and its value estimated. Once the record is

Fm. 9-9 (600912) 64162-D	
<b>NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO.</b>	
Date. _____	
<b>EMPLOYMENT AGENT:</b>	
I have this day instructed this employee as to his duties and cautioned him against accidents.	
Check No.	Name
Acknowledged.	
Employee	<div style="text-align: center;">Signed _____</div> <div style="text-align: right;">Foreman</div>

FIG. 15

taken, it costs almost nothing to place it in the man's folder or envelope.

**43.** If records are kept at all, there are obvious advantages, from the standpoint of efficiency, in having all the records of each man in one place. Of course there will be a little duplication of work with the pay-roll department, because the latter has the original record of the man's rate of pay. It is, however, desirable that the employment department keep this record, as that department should be a party to the agreement. It is also necessary that the employment department should know what the employe's pay has been when recommendations for increase are pending. There are

so-called employment departments that are not consulted when increases are pending, but they are rather the exception.

The safety engineering department will undoubtedly have need for holding the whole record, folder or envelope, of such men as are under its care through having met with injuries for which they are entitled to compensation, and the medical department may wish to consult the records from time to time, but it is seldom that two departments will need one man's folder at the same time. There will be many times when some matter for which the records are required comes to the attention of the general manager; but that is likely to be in the case of some old and especially worthy employe who is in need of special and peculiar attention, or in case a man has trouble or misunderstanding and the management wishes to know whether to assist him or not. Experience indicates that, when thoroughly kept, these folders are consulted often enough to justify keeping them. However, unless they are kept well they had best not be kept at all. There is likely to be more difficulty in getting well-kept records from the hospital than from all other departments together, as there seems to be something in the make-up of successful medical men which abhors all records; part of this appears to be a reluctance to make written statements about things concerning which they are in doubt, and the rest the natural disregard for order which seems to possess most purely professional persons.

**44. Conditions the Employment Department Must Meet.**—After the employe is once on the pay roll, the test of the employment department's selection begins. It therefore behooves that department to make sure, so far as possible, that its selections get a fair chance to make good.

When an organization has, through its chosen department, bought labor in large quantities—in even a moderate-size concern the amount is over a million dollars a year—it seems as though it would make every effort toward the best possible use of that supply. This would only be good cooperation. Any newly organized employment department,



however, meets jealousies which, foolish as they are, must be overcome before the department establishes its place in the organization. There are jealousies on the part of the foremen, who enjoy taking an hour off from work and going to some part of the plant to look over the applicants for a job, and who find that they can stay right on the job of supervising their departments while the supply is being gone over and brought to them for inspection. The foremen also feel a loss of prestige, because when they meet a man down town in the evening, when perhaps they are not in condition to make a selection of anything, they cannot promise him a job in the morning. They also feel the danger that they will not be able to get son-in-law a job at a moment's notice.

Also, there are the employment agencies, that have made money out of the shop by sending men to work, then offering them other jobs and getting them new jobs all over again. Their methods are directly the opposite to those of the plant employment department, as the greater the turnover of labor the more money the agencies make. If they can shift a man from one shop to another every month, they make as much money as if they shifted twelve men once a year. These agencies will work indirectly to discredit the new department, even in some cases to the extent of deliberately sending to it the most impossible candidates for jobs. The employment department may be able to make use of some men from this source, but only after giving them fully as careful scrutiny as is given to any others.

Some opposition, also, may develop among the employes themselves, especially the older men who are accustomed to get and hold jobs through personal favor rather than merit.

**45. Follow-Up in the Shop.**—It is for everybody's interest, not only that the men selected and approved shall do well, but that the management shall know that they do well. If the company is on a piece-work basis, the employe's good work shows on the pay roll, but it is an exceptional shop where half the workmen are on piece work or any form of compensation that requires the keeping of accounts with each

employe in such form as to indicate his value to the company. The rest of the men are usually on day or hour rates, which are likely to have little relation to what they earn for the company. For this reason, it seems that the record of piece-work and premium, or bonus, earnings should be looked over by the employment manager, if for no other reason than that he may know how well the employes of his selection are making out.

Then there should be a general looking over of the shop to find out if any employes are dissatisfied, before their dissatisfaction becomes acute. It is very natural that men hired through the employment department should bring their grievances to the attention of the men in or from that department more readily than they will to the foreman. They have had experiences with foremen whose only answer to a complaint was to discharge the complainer, but they do not suspect the employment department of either the disposition or the power to discharge. A great deal of follow-up work is, therefore, automatic, if the representatives of the department only circulate around the shop; and that they should surely do, if for no other purpose than to keep up to the times as to changes in methods and places where work is done, and to know at first hand what the work is for which they are selecting men, and the conditions under which the work is done.

**46. Shop Changes.**—A very little experience of the kind just mentioned will show, in almost any shop, that there are things that could be changed to make the work easier or more attractive. These things will vary from little idiosyncrasies of foremen to really vital things affecting the health of the employes. It has been the habit of many shop managers to pass over or ignore such things, and it is only by tabulating complaints, and demonstrating that it costs more to sustain the turnover caused by them than to remedy them, that the employment department can secure attention.

It is a valuable practice to have the foreman make a definite statement regarding each of their men every month or quar-

ter; but the order requiring this statement had best emanate from the office of the works manager or the superintendent, rather than from the employment department. The foremen feel a direct responsibility to their immediate superior only, and very little if any to the employment manager, unless the latter happens to be a member of the board of directors. It is very much of a task for the average foreman to make up such a report. In the first place, he is not a clerk and he dislikes clerical work; in the next place, the chances are against his being sure that he knows all his men by name. If the latter is the case, he ought to have to make such a report frequently, so that he will get to know them. These reports should be turned over to the employment office to be entered on each man's record, and for investigation of any cases where the reports seem to indicate bad placement of men or that men might well be promoted to better jobs. Foremen will be pretty careful about reporting the latter condition; and no very flattering remarks may be expected. However, some way must be found for getting the men into the places for which they are best fitted. This can be done by transfers or by training.

**47. Transfers.**—If a foreman finds that he has a man working as a helper, who looks well and who is a good worker, he will immediately be interested to develop him into a journeyman. However, if the employment department discovers that a certain man is better fitted for work that another foreman has charge of, the first-mentioned foreman will almost surely make strenuous objections to the transfer of the man. This is partly because of a survival of the old feeling of ownership in human beings and partly in self-defense. It is customary for a shop manager to speak of his workmen as "my men," and for each foreman in the same way to have *his* men. Unconsciously, this becomes something much more than a figure of speech; it becomes an accepted fact, and one that is not apt to be controverted until an employment department is organized. The self-defense idea is based on the assumption that each foreman has personally trained his men and

that they therefore owe him something which can only be repaid by their staying on the job indefinitely. There is likely to be a great difference of opinion about this. A foreman may claim to have "taught so-and-so all that he knows about the trade," but the man may very likely think that the firm never found a man before that could do the work and put up with the interference of that foreman. And the one is just about as likely to be right as the other.

The only solution of the problem of personal ownership is the strong hand of the management. If the works manager says that every man is to be placed where he is most needed, and then takes the matter of so placing the men into his own hands, there is little trouble after the first foreman has threatened to resign unless he can have a given man, and has not done so when the man was transferred. The feeling of personal obligation arising when the foremen train the men can best be avoided by an organized system of training each man for his job, in the way that the company has found most effective.

There can be but little doubt that each foreman should subordinate his views, in regard to the place where a man may be best employed, to some one who is in a position to see the whole job rather than only the portion that comes within the view of the shop man. The works manager may have to take this problem to himself; but, if he does, he will be almost sure to lean heavily on the advice of the employment department, as that department is most likely to be in a position to know what departments are in need of help and where a given man will do the best work. The works manager is in a position of accepted authority, but in most shops shop opinion in regard to the authority of the employment department is still being formed. Impartial service on the part of the employment office in making transfers is sure to produce resentment on the part of the foreman from whom a good workman is taken. Almost every foreman can readily see that men should be distributed where they will do the company the most good, but very few are broad-minded enough to accept the transfer of a valuable man from their own crews without rancor.

## HOLDING MEN IN THE SHOP

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### WAGES AND CONDITIONS

48. **Wages.**—It is trite to say that “Money is not everything,” but it is not safe to omit serious consideration of the wages that are offered. When men who leave the company are questioned as to their reasons for so doing, more often than not they will say that they are going to get more money. This may be literally true or it may not. A little questioning by the employment manager or his representative may show that the additional money may prove to be a saving in car fares paid, or it may be that the change will bring the man near home where he can get his lunch for apparently nothing, or it may be that he is going for less money, but he hopes or expects soon to make more on piece work or on bonus. It may be that he is going to get more, but that he is going to a disagreeable job that he intends to drop just as soon as he gets that additional \$50 that he must pay on a graphophone that he bought in a fit of spending. There are men who make a regular round of shops where, alternately, in one they have an easy time at small wages and in the next they get big wages for hard disagreeable work. So it is safe to say that every pay roll is made up of two parts: one, the smallest amount for which the necessary help could be got under the best working conditions; the other, the excess paid because of wet, dirty, dusty, and other disagreeable conditions, distance from housing, bad transportation facilities, and a multitude of other disadvantages. The effect of many of these can be fairly well estimated, and the advisability of remedying them can be determined from a profit-and-loss standpoint.

49. Independent of considerations such as mentioned, the rate of wages is usually a fluctuating value determined by the state of the labor market. Of late years, in response to public opinion, and in rare cases to minimum-wage laws, the minimum wage has been set at something above the lowest level at which labor could be obtained. Public opinion abhors

the idea of treating labor as a commodity, since it amounts to very much the same thing as treating men as a commodity. There is a very distinct feeling that a laborer should be paid enough to enable him to maintain the "American standard of living," a rather indefinite term which is usually understood to mean that he shall be able to purchase for his family all the necessities and many luxuries. That is, he should be able to keep a good tight roof over their heads, have a warm house in the winter, food that is plentiful and nourishing, clothing that is warm and lasting and not distinguishable from the ordinary garb of the wealthy, and a reasonable amount of recreation. This very reasonable requisition has been more than filled at some times and has not for any extended length of time been withheld from workmen in this country.

Beyond this, however, wages have advanced in times of scarcity of labor with bounds that were seemingly out of all proportion to the forbearance with which employers have failed to follow the labor market on its downward swings. When there is even a very slight undersupply of labor, it is possible, for those who wish, to put their labor on the auction block and sell it to the highest bidder. At such times it is almost certain that employers are in a position to exact higher prices from the purchasing public, and in order to take advantage of the high market for their wares they pay any demand for higher wages, with only a show of reluctance. In the parlance of the fields, they "Make hay while the sun shines." The injurious effects of this short-sighted policy are too evident to need any discussion.

Just what proportion of the selling price of any article belongs to labor, how much to management, and how much to invested capital and borrowed money, is problematic. So long as people are so easily influenced by untruths, so easily scared by the fear of things that never happen, there are likely to be serious ups and downs in business. Whenever there appears to be a large margin of profit in any one line of business, there are numbers of people who see an opportunity to make a large profit, and who think they are keen

enough to get out before the crash comes. The automobile business is a case in point. The electrical business has had a similar experience; and even today there are people who think that electricity is "only in its infancy," and that they can enter the business without previous training, capital, or experience and take some of the supposed enormous profits now being monopolized by the large companies. They look at an electric flat iron, figure what the materials cost, and assume the price is two-thirds profit, only to discover their mistake when the bankruptcy court relieves them of the necessity for paying further for their experience.

50. Since labor rates follow the market so closely, it is part of the employment department's work to keep in close touch with the market. This the employment manager is in a position to do if he will take all the stories told him, both by men who want jobs and those who are leaving for "better ones," with a grain of salt. All of them have incentives for exaggeration, and some will exaggerate more than others, but if the statements of the most imaginative applicants are properly discounted, the result will likely be fairly near the truth. Rates as quoted by competitors for the same help will probably be about as much low as the rates stated by the men themselves are high. This is no reflection on the truthfulness of either, as there is usually some flexibility in rates, and often the general manager is unaware that wages have risen in his shop until some little time after the change.

As a basis of comparison, almost all wages are now quoted at so many cents per hour. The actual income has to be arrived at by knowing how many hours make a week of regular time, how much overtime, if any, is being worked, and what percentage of the year the work goes on. For example a bricklayer in the latitude of New York who works over 200 days per year is very fortunate. If the members of his craft are able to reduce the working week to 40 hours, as is the case in some instances, it is easy to see that he works only about a half of what was formerly considered a working year; namely, 3,000 hours. If in that time he must get a wage



that will support his family on the American standard of living as previously defined, it is evident that he must work very efficiently or else get paid for what he does out of proportion to those whose trade permits of more days of work and whose ideas include a longer working day and week.

The hourly wage rate is undoubtedly the most common method of paying for men's work, whether in common labor, semiskilled, or expert. Unless, however, it is coupled with a fairly definite idea of what constitutes a day's work, it is a very inefficient method of paying for labor. If, on the other hand, it is understood that a day's work of 8 hours, for example, covers the laying of 1,200 bricks, then it becomes virtually a straight piece-work rate in which slight daily fluctuations are covered by the day rate. Every man then knows that if he falls below that rate he will have to look for another job, unless the foreman is virtually willing to make him a loan of the money represented by his failure to make the pace, with the expectation that the loan will be repaid by more rapid work some other day in the immediate future.

**51.** More often than not, the day rate simply indicates the inability of the employer to say what he thinks his workmen should accomplish in a day. This inability comes from a lack of knowledge of just how the work should be done. The importance of knowing the different methods by which work is done is illustrated by a piece of work in a machine shop; for example, a planer job that requires a considerable amount of time for setting up. The first time a job of this kind is to be done it may come into the shop when all the other planers are running on simple flat jobs requiring a minimum of blocking and straps. The time is kept track of and recorded. The second time it comes in, all the other planers may be using large quantities of blocking, and it may take twice as long to do the job as it did in the first instance, because of the time spent trying to find suitable tools with which to set it up, and because it was finally set up so that only the most careful cuts could be taken for fear of tumbling the whole job down. Of course, when

such a piece is to be manufactured regularly, there will be a cradle provided into which it can be set with only a few minutes' work for leveling, and it will be firm enough so that cuts up to the limit of the strength of the piece can be taken. Then the employer can make a piece-work rate that will undoubtedly be fair; but then he has reached a basis where he can also tell from the time slips whether the operative is doing a full day's work on an hourly basis. The opportunity for a highly skilled man to earn a great deal of money for the firm was in the crude first stages, when he had to use his ingenuity to make whatever tackle he could find hold the job securely, without using a long time to find it.

Day work in itself offers incentive to effort only as the day wage is high enough so that the workman knows perfectly well that no one else will give him so good a job if he leaves this one.

Such incentive, however, has no permanent value. Either other employers raise their wages to come up to this higher standard or else the men grow to get the idea that because they continue to get this wage they are so valuable that the first employer will not drop them. So to the lure of a higher wage there must be added the negative inducement of a constant, though small, stream of men being discharged because they do not keep up to the company's standards of production. This is unfortunate, but it is human nature to grow to feel that we are very important to an organization, and also easy to get the idea that we are doing a great amount of work. Activity and laziness are only relative terms. A man can keep busy doing a very small amount of work. He becomes a putterer, and a putterer in the very great majority of cases only delays production. There is very little work that is really improved by being done better or more closely to size and with a better finish than is prescribed by the management. The man who grows to feel that it is very important that his work be exactly so, begins soon to exaggerate his own importance and to feel that he should be pressed less and less for quantity production.

The cure for all of this tendency to laziness, and to self-

importance is some form of wage payment that will put a premium on production. However, no system of this kind should be installed without first weighing carefully the advantages to be gained against the increased cost of inspection and the increased danger of spoiled work.

**52. Inspection.**—When artisans work at day rates, their work is almost always well self-inspected within the limits of their knowledge of its requirements. Inspection in such cases depends mainly on the interest that the employes feel in the product. The men who assemble the finished product and those who apply the finish, as, for example, painters and upholsterers, can be depended on to do uniformly good work much more than can the men who run screw machines making some obscure part of the transmission. Many efforts have been made, and successfully, to make employes realize the importance of their part of the work, with the idea of bringing up the quality of the product. For example, a large manufacturer of women's clothing has stereopticon slides of all the different parts of the works showing the processes of manufacture, and these pictures are shown to each group of employes. As compared with another large works where the employes in one department know nothing of the processes in any room but their own, except for the stories which are told by fellow employes, the difference in morale is easily visible to any chance visitor.

Inspection, however, becomes a necessary part of any manufacturing as soon as the business outgrows a very modest beginning; and it needs to be more carefully done if piece rates are used than if the work is done by the hour or day. This more careful inspection, however, costs money, which must be balanced against the increased production expected. As a rule, workmen in any but the smallest shop do not feel antagonistic toward an inspector, especially if they are convinced that he has no favorites. There is no doubt that every one enjoys seeing the mighty fall at times; and an inspector who occasionally turns back work on a man who is related to the management, or who has a reputation for being always

right, achieves a place of honor in the minds of the rest of the employes whose work he is inspecting.

**53. Piece Work.**—The best known and most abused method of getting production by means of financial rewards is the piece-rate plan, in which a price is set for doing each operation or group of operations. This plan had its greatest vogue at about the time of the Civil War, when the plan of farming out work to contractors was much in use. Then a contractor would make a bid for doing all the work of building a steam engine, for example. He assumed only the cost of labor and such part of the overhead charges as the wear on the tools used by his workmen, the oil they consumed, and the very light burden of bookkeeping and cost accounting which he usually did in his head. He paid his workmen from his own funds and usually paid them by the piece. He was a workman himself and able to demonstrate to any workman who questioned him that a capable man could make good wages at the rates which he offered. He set his rates from personal experience, and he really did know what could be done. Needless to say, there is not a great deal of production now on a basis of this kind. The success of this type of management was based on an abundance of skilled help, or of young men and boys of high intelligence who learned rapidly and thoroughly. Many of these former contractors are managers of large companies today. It is doubtful if there could be any better school of efficiency. These contractors seldom had more than fifty men under them, but they gave them their undivided attention, they were right on the job, and, being very capable men, earned and made large profits. A profit of \$5,000 a year (worth \$10,000 now) was not unusual from fifty men.

**54.** In the process of evolution, the proprietors of these shops, whose function it was to secure orders, buy materials and equipment, and furnish rent, power, heat, and light, became jealous of these contractors, who often made a greater profit than did the owner of the business, and tried to combine their own functions and those of the contractor. In their

avariciousness, or perhaps because of their lack of knowledge of human nature, they also became jealous of the high wages which they found the workmen made. The contractors had made money out of seemingly nothing and were very content to live and let live, so they did not mind if their workmen made a good thing of it also; but the commercial spirit of the capitalist urged him to take every dollar in sight, with the result that he put piece rates in bad repute by cutting them whenever he saw a chance for a workman to live on a less rate than he was getting. As soon as this became the established plan, workmen naturally observed what rate per day the owner appeared to be willing to allow, and then worked just fast enough to approach close to that limit. That is, they went back to virtually a day rate, though ostensibly paid by the piece. The memory of those days, or the story of them, still stands as a great obstacle to the revival of straight piece work.

An additional disadvantage of the piece-rate system is the danger of setting rates without positive knowledge of just what the workman can earn if he will. A common cause of error is the attempting to set a rate on a new job from observation of the time required to do the work with insufficient or makeshift equipment; but there are still more cases where the man who sets the rate simply does not know how to do the job himself, nor how fast it can be done without undue weariness. Theoretically, piece work is the best system to use, for the earnings are easily figured, as they are in direct proportion to the number of parts done. It is easily understood; but its weak point is in the necessity for having the rates set by experience, and prorated scientifically for different sizes and variations, and it has only been recently that men who could combine experience and science were available.

**55. Premium System.**—Under the premium system, the hourly rate is guaranteed to each workman so long as he is retained on the job. A standard day's work is set. If he exceeds that amount, he receives from a quarter to a half of

the saving. For example, suppose that his hourly rate is 50 cents and that he is supposed to do a given job in 8 hours. If he does this work in 6 hours and the premium is one-half the hourly rate, 50 cents additional will be allowed him for the 2 hours which he has saved. If he goes on and completes the 8-hour day at the same rate, his total earnings for the day will be \$4.67, or an increase of one-sixth in his pay for accomplishing \$5.33 worth of work. The purpose of the premium system is to do away with some of the apparent loss due to the rate fixer's lack of knowledge of workmen's capacity for production.

Under the piece-rate system a man who is skilful and slightly avaricious may make large wages for a short period of time. While he is earning this high rate, there is a great tendency on the part of managers and superintendents to cut him down, either directly, or by rearranging the work and establishing new piece rates, which is not much better than a subterfuge. Under the premium system, this increase in productivity is not rewarded in proportion to the amount produced, but excess production only brings from a quarter to a half of the extra pay that would be earned under a straight piece-work rate based on the same conditions under which the basic or normal production is figured for the premium rate.

The advantages of the system are that the men know that they will continue to get their hourly rate plus whatever their premium may be. However, in making comparison of wages between shops, it will almost always be found that workmen compare on the basis of their hourly rate. Very few figure back to see how much they really receive for each hour worked. They seem to assume, often wrongly, that the same opportunity to earn an extra premium or bonus exists in all shops, and too often fail to make inquiry until they have worked for a week or more. The workman who thinks the matter through discovers that under the premium system he actually receives less per unit of work completed as he accomplishes more. He realizes that the limitations of machinery and equipment and his own strength do not permit him to increase his production beyond a certain limit, and the limitations of the

premium system do not pay him proportionately for the increased effort. He is told that his increased production is expensive to his employer, as it wears out the machinery faster, uses more power and more unskilled labor to bring him his work and take it away. He probably takes little account of this statement, as, if he is able to see through the plan at all, he can see that the total overhead charges of the company per unit of production are considerably decreased by the rapidity with which he gets the work through the shop.

**56. Differential Piece-Rate System.**—The expression, *differential piece rate*, does not convey exactly the idea that it should, but the name is in use. The system consists of setting two piece rates, one for slow workers and one for rapid men. The piece rate for high production is the higher rate of the two, which is the direct opposite to the premium plan. That is, the man who achieves the rapid production rate finds his efforts very liberally rewarded suddenly. If he drops back below the limit, he finds that he has lost just as suddenly. This system can be installed safely only where the work is sufficiently repetitive so that plenty of time and effort can be put into finding what a man can be expected to accomplish. Under this plan the good workers are so liberally rewarded, so long as they keep up production, that there is not much danger of their being attracted by other shops operating on other plans of payment. On the other hand, the penalty for not keeping up to the standard rate is so prompt and acute that workmen are in no danger of becoming puffed up. The plan ultimately eliminates most of the slow workers with the exception of those few who have become reconciled to small wages and to whom surety of employment is of more consequence than large pay. That is, those who have lost hope or who have a sufficient income from other sources so that all they require is a place to spend some of their time and nothing to worry about.

The differential piece rate recognizes that increased production reduces the overhead charge per unit of work, and shares that reduction to some extent with the workman.



The principal objection to its use is the considerable addition to the overhead, occasioned by the expensive study of the methods of production before it is put in effect. It will not do to base the two piece rates on past experience with either day rates or straight piece work. It should be based on experiment and analysis of the job into its elements, almost into the motions to be made in performing operations. For example, the scraping of a lathe carriage onto its bed may easily take 10 hours for a medium size and length of lathe. If, however, the planer hands who plane both parts have had a little experience at scraping, it is possible to get the planing so well done that the required time for exactly as good a job is only 2 hours. The excess time for planing is not more than a few minutes per piece. If this work is put on piece rates or on differential piece rate, then the scraper hand who finds that he can earn so much more if the planing is well done may very likely offer a substantial bonus of his own to the planer hand; because, the expenditure of a few minutes' extra time may make this rapid scraping possible. In such a case, the rates for both planing and scraping should have been so set as to make it profitable for both men to do their best work, first by giving the planer hand a liberal enough rate so that he will not leave his work rough and distorted in order to make the higher piece rate, and second, by making the rate for the scraper hand such that he will, by diligence and the application of brain power, complete the work within the time allotted.

**57. Task and Bonus Plan.**—One of the troubles with the differential piece-rate system is the difficulty of getting men to make the necessary effort to reach the higher piece rate. To overcome this trouble, Mr. H. L. Gantt used a plan which gives each man a guaranteed rate for the time spent; but if the man reaches or exceeds a predetermined production, called a *task*, he receives a bonus in the form of additional time allowed. This bonus may be as much as a quarter or a half of the time taken to complete the task. The task is usually high and the bonus is high to make it worth working for.

This system has the advantage of a sudden jump in pay earned if the task for the day is accomplished. In other words, it has the psychological effect of giving or withholding a substantial reward according as a certain limit of production is reached or not. The workman knows that he will have to pay close attention to his work to make this reward; therefore, he is not likely to develop egotistical tendencies. Another advantage is that each man knows that he will make his day rate, and that whatever he gets above that is his incentive for the extra work. Therefore, his profits, as distinguished from his guaranteed day's pay, are plainly apparent.

**58. The Bigelow Bonus Plan.**—Under the Bigelow bonus plan, a piece rate is set which grows larger as production increases. The low, or initial, rate is set for a production that all can attain easily. That is, if a man can at the very outside produce 100 pieces per day, it is assumed that any man may reach 60 pieces, for example, and a piece rate is set that will allow a living wage to be made at that rate of production. Whenever the man pushes up his production above the 60 pieces, his piece rate is *increased* so that if he should reach the ideal, or 100-per-cent. production, he would receive a 40-per-cent. increase over his piece rate. This gives a larger inducement for production than any of the other systems, and is directly contrary to the old piece rate with its constant cuts whenever a man succeeded in finding a way to make a large income. It frankly says that large production effects such decrease in overhead expenses that the management can better afford to give the money to the workers than to people who merely add to the overhead charges, important though they may be. One objection to this system is the temptation which it puts on an employer to reduce rates, as in the old piece-work plan, when business is very bad and the only way to get it appears to be to cut prices, a practice that appears to do no one any but the most temporary good. Another objection is the danger that men who are overambitious may injure themselves by overwork. The method should not be applied to purely manual work without a stopping place; because,

even though some men might be well able to do a great amount of work without injury, there will inevitably be many who must be hired in order to get all the work done, who would be badly injured if they did all the work that a large, strong, and capable man can do.

**59. Résumé.**—Taking all these systems as they have come, we are struck with the educational process through which employers have gone. First was the day wage, an expression of ignorance of what a workman should be able to do. Then piece work, abused by cutting rates to make it practically a day-wage system. Then the discovery by Taylor that a high wage is most profitable if it can always be kept before the worker that his continued prosperity is dependent on constant effort. Then the Gantt system, which takes into account the fact that men need and demand a minimum wage which will permit of the necessities of life. Then the Bigelow system, which frankly admits that the workman is entitled to a share in the reduction of overhead charges for which he is himself responsible. What further remains to be discovered does not appear. The Bigelow system takes each man into partnership so far as his own work is concerned, but it does not make him a partner in the work of others

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#### NON-FINANCIAL CONSIDERATIONS

**60. Hard Work.**—Money earned, especially if the workman knows constantly that he is liable not to be able to keep up his wage unless he keeps up his work, has a strong attraction. However, it is very true that other considerations weigh more than money at times. First of all, men get tired and worn out, not with too hard work, but with too much monotony. Almost always when a man says that the work is too hard and that he must leave the job for an easier one, the real reason will be found to be the sameness of the job, and his weariness is mental rather than physical. This is just as bad for the firm, however, as though he really were made sick by excess of work. Of course there are cases where

physical work does exhaust, as, for example, in shoveling coal, digging ditches, etc. A bystander, watching a ditch being dug by hand, and especially on a municipal job, is very apt to have something to say about the laziness of people who work for the government. What he should say is that it is very inefficient to employ men to dig, if there is any other way of getting it done. No one can work continuously at it, to say nothing of keeping up a pace that seems at all hurried. It is very likely that the average man could do all the work there is in him in a 6-hour day, and that is about what he does as it is. The rest of the time is spent straightening up and getting the kinks out of his back, lighting a pipe, getting a drink of water, and other little subterfuges which really express a necessity rather than any desire to soldier on the job.

**61. Disagreeable Work.**—When there is a choice, men do not take jobs that are dirty, dusty, wet, monotonous, heavy, or dangerous, without greater rewards of some kind or other. Men are not adapted or intended by nature to be beasts of burden, and they cannot work continuously at heavy work. Dusty work is not only disagreeable but it is likely to lead to illness. Almost every one has some bronchitis, and we always will have so long as we live in cities instead of in fresh air. Bronchitis is aggravated by dust, then pneumonia is easily acquired, and from that to a weakened system that lets the tubercular germ multiply is only one more step.

By a dirty job is meant one that makes it difficult ever to get clean except by taking a vacation. For example, a man working in a machine shop on cast iron continually is likely to find that it penetrates his clothes, works into the lines of his hands, fills his nostrils, and undoubtedly gets into his lungs. The same is true of a blacksmith's work, especially with a soft-coal fire. Men who take such jobs have to associate outside working hours with those who are not fastidious about cleanliness, or else with others like themselves who cannot make themselves presentable. Some of these dirty jobs cannot be prevented in the present stage of the art, but such of them as can, are likely to prove more profitable for the change.

The greatest appeal to Americanism comes through pride, and we cannot expect people to be proud of their country unless they can hold up their own heads in any society.

Wet jobs are disliked only as the wetness is harmful to health, or as it is a dirty wetness. There is seldom any trouble getting candidates for the job of life-guard at the beaches, and of all jobs there is none wetter. On the other hand, a man who slops around all day and all the year and possibly for a lifetime in a tannery, always wants an extra reward for doing it over what he would take to work at a nice, clean, comfortable job.

**62. Danger.**—Dangerous jobs are always calling for a premium to the worker, unless there is something about the job that appeals to a man's vanity. Structural-steel workers have a very dangerous calling, part of which is paid for in the pay envelope and part of which comes from the admiration of the crowds that gather around and watch and appreciate the performance. The same is even more true of circus performers, riggers, and other men whose work depends on sureness of foot and hand, and whose work is in the public gaze.

Most dangerous jobs in manufacture have nothing of the spectacular about them and consequently have to be paid for in cash only. Some of them conceal hidden dangers and are accepted by workmen without any thought that they are dangerous. Some become dangerous only at times, some only through the carelessness of fellow workers. For example, a man may work under a traveling crane for years and never even witness an accident. There may be a change in the personnel of the gang that attends to moving machinery and castings, and the new gang may not understand the business, or they may be careless, and a casting may be dropped directly on the man, killing him or maiming him for life. Every such accident affects the labor turnover. If the men who witnessed the accident do not take the news home to their families, the latter get it from the newspapers and then secure all the details from the wage earner. Then they set up a process of begging

him to be careful which turns into nagging, and the man is soon ready to look up a new job, even if he has to take a lower wage to get it. This may seem a small thing to increase the labor turnover, but it should be borne in mind that these things come very close to workmen who have nothing saved up and whose only hope of keeping out of the poorhouse is a constant job. Of late years, the workmen's compensation laws have improved conditions somewhat; but none of them provide for all of the loss sustained, for fear of encouraging malingering, and it is only very recently that serious consideration has been given to any means for training industrial cripples for worth-while jobs. Every wife who sees a cripple on the sidewalk selling pencils, looks on him as a warning of what her husband may come to, and there is little doubt but that such things have a strong influence and rightfully so.

**63. Comfort of Mind.**—Mental anxiety, fear, and worry are just as harmful as the things that are worried about. They prevent men from doing their best work. Whenever a man who has been in the habit of doing well begins to lose his interest, and decreases his production, it is wise to inquire into affairs which may affect him mentally as well as physically. It may be that some one in the shop is annoying him, it may be that he owes money that he cannot see his way to pay, he may be having trouble at home, he may have a son that is causing him anxiety. Instead of discharging him out of hand, which only aggravates his trouble, it is better to adopt a sympathetic attitude and try to discover just what is at the bottom of his troubles. It is very possible that the employment manager can find a way to reassure him and help him out of the predicament he is in, or which he fears he is in, as happens in the larger number of cases.

**64.** The surroundings in which men are placed have a greater influence on their productivity than many imagine. If a man is not sensitive to his surroundings, that in itself should be reason enough for questioning whether work that requires mental alertness should be entrusted to him. That is, instead of accusing men who are fastidious about their sur-

roundings of being eccentric, it is more to the point to realize that men who are responsible for things requiring thinking capacity must have a considerable degree of sensitiveness themselves.

The surroundings which affect people may be the room, the outlook, the atmosphere, or the people with whom they are thrown in contact, or whose voices they hear. For example, in a large office one man broke up the morale of the whole force because, not being used to working among others, he raised his voice so high when telephoning as to cause a hush all over the room. When he was placed in a small room, he used his natural voice and everything was all right. In this case the man's personality was of the best; simply he could not get used to telephoning where he had to listen closely to get the other man's conversation. There are, however, many cases of men who are discordant who do not intend to be and whom it is almost impossible to dispense with and feel that justice has been done—men whose intentions are of the best, but who through lack of knowledge of English are constantly saying things that lead to misunderstandings. This is not confined to clerks and workmen; a great many business men who have made considerable sums of money have very little acquaintance with the subtleties of the English language.

65. Then, there are the men who apparently deliberately intend to wreck the morale of the place; who go about misrepresenting each person to others, who aggravate each man's known animosities by sly statements that are founded on fact, but which are given a very different sound from that intended. For example, a works manager had a favorite method of introducing a topic on which he wished an opinion, by saying, "so-and-so says you are all wrong about it," when as a matter of fact the first man had merely raised the question as to the most politic method of doing the thing. Things like these irritate men and finally bring them to the point where they are ready to look with favor on other positions which otherwise would not be attractive. The only way to handle such situations is to get clear to the root of the matter and insist that



all private grudges be brought into the open and that all idle and meaningless gossip be omitted. If two men who have antipathies are brought together and the trouble is traced back to the thing that started it, it is very seldom that it does not turn out to be some trivial and misunderstood difference that could have been quickly ironed out by an appeal to the men's loyalty to the company. It does not take a large force to have enough of these feuds going on to make all the difference between a comfortable profit and none at all, due to the way such men use their authority in the company to put some other man in a wrong light with the management.

**66.** Tenure of job is of great importance to men with families to support. There is a very decided and well-founded desire on the part of most firms to have as large a proportion of married men in their employ as possible, and yet some of them overlook the fact that such men will always choose to work for a firm that is known not to be hasty about dismissing employes. For this reason, if no other, a reputation for fairness toward employes is worth considerable effort. Every man who is turned out without just cause, or who is dropped because of a slight letting up of orders, tends to reduce the desirability of the job for some one else. The common practice of letting men without dependents go first in case of business depression is an excellent one, as it gives men who have dependents a much greater confidence in their own future.

It is probably not a good idea to make tenure of job anything definite. That is, removals of men who turn out to be destroyers of morale and who cannot be made to see the falsity of their position should always be possible. Men should have no chance to feel that they can slacken their efforts to do a good day's work and still be retained on the pay roll. However, it should be possible for any man to feel that the mere fact that he is approaching a given age does not make his working days more precarious.

The establishment of an age limit for entrance into employment or as a time when a pension system is to go into effect, with compulsory retirement, is not altogether justified;

because the number of years of a man's life has such a variable relation to his mental and physical condition that, with a fixed retiring age, one man may be carried long after he should have retired and another may be cut off years before his work should have ended. It is a fact, however, that a man's physical powers begin to recede just about as his mental powers grow. Men can seldom stay in active athletics much beyond the age of thirty. At thirty they are only developing the power to reason and think straight. They may be as intelligent at eighteen as at thirty, but they have not had an opportunity to gather the experience which is needed to round out a man's education, and despite all the advances of science we still have to work from experience rather than from pure reason.

It seems as though the time of entrance into an organization should be determined by the work which the man is to do. If the work is physical labor, the determination should be made by the medical department; if mental, by the man's own past history. It seems to be a fact that men's minds grow in capacity with added experience, and it is only the tendency to cling to older associates and to turn away from young men which makes a man grow old mentally. If a man of mature age keeps up his association with the younger men, on a plane of equality, there is no good reason why he should not continue to grow in value to his employer so long as he retains his physical health.

The theory advanced by some, that if a man has not made his mark in the world by the time he is of some certain age, anywhere from forty to fifty, he is a failure and should be debarred from employment altogether, is another thing that is hardly justified by experience. Very few men, as compared with the great number, make a success of business at any age. Very few men who would be successful in business for themselves would be satisfactory employes. Ability to make money appears to have little relation to intelligence, mechanical ability, or to any other measurable attribute. Men over 50 years old do work and must work. If they are so unfortunate as to have become as old in spirit as in years

they may be content to take gradually less and less pay and to gracefully slip into oblivion. If on the other hand they keep young in spirit, they become the advisers of the younger men, and the ones to whom every one instinctively turns for help in new and untried positions. Again, it is a poor organization that does not effectively utilize all the abilities of each employe. The physical energy of youth, the studious attitude of some, the belligerency of one race, and the servility of another, the experience of middle age, and the counsel of advancing years are all a part of the world in which we live. If all are not used, we are just as improvident as those who harvest only the largest fruit and leave the rest to rot because it is not easy to pick.

# PERSONNEL RELATIONS

(PART 2)

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## LABOR TURNOVER

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### METHODS OF COMPUTING TURNOVER

**1. Cost of Turnover.**—When the loss caused by a too rapid flow of workmen through the shops first began to attract attention, the first discussion of this matter bore principally on the great cost of rapid turnover to industry as a whole, because of the necessity of training a great many more men for jobs than seemed to be necessary. This discussion did not, however, take into account the employe's side of the question. It did not take account of the lack of means for fully learning any trade, and it failed to call attention to the fact that men really need to know how to do more than one thing because of the rapid changes in modern business methods.

Briefly, the statement was made that on the average men changed jobs oftener than once a year, and that if they stayed on each job for five years instead of one, the total cost of training or breaking in new men would be reduced in that proportion. If the cost of changing men on a job was some certain amount, as, for example, \$50, then in shops employing any considerable number of men the saving would be easily computed and would be a large amount.

In a shop employing 5,000 men, a reduction in turnover in the proportion mentioned would amount to a saving of \$200,000 per year. This in itself would not be a very large

profit on the business which a shop of that size should do, but as an addition to its regular profit it would be well worth considering.

2. In times of great business activity when profits are large, the turnover will greatly increase; for the different shops will bid against one another for help, each manufacturer apparently being afraid that the opportunity for profit will pass before he can get his share. On the other hand, in time of depression, low labor turnovers may be expected; for men do not so readily leave a job when they are not sure that they can get another. Thus, while an annual turnover of 200 per cent. might not be considered abnormal in times of great business activity, a turnover of 100 per cent. in dull times might be considered an indication calling for careful investigation.

3. **Computation of Labor Turnover.**—There are three principal methods of figuring labor turnover, and there are a number of minor variations. The only purpose of computing turnover is for comparison with past records and with those of other shops and offices. The different methods give different results, and for this reason there is an advantage in coming to some agreement as to what method shall be used.

The percentage of turnover is in all cases the ratio between the average working force and the number of changes in the personnel during a year's time. The determination of what constitutes the number of changes is the principal cause of disagreement in the results of the different methods. Some computers consider the number of changes to be the number of persons leaving the firm's employ. Some prefer to use for calculations the number of new employees taken on, and others prefer to use the number of replacements. Those who use the number leaving say that it is the proper method, because all the efforts of the employment department are centered on getting the kind of employees that will stay and then making it wise for them to stay, and that, therefore, every man who leaves, whether he is discharged or leaves on his own account,

is to the discredit of the employment department. Those who use the number of men hired favor that method because, they say, the cost of getting these men is a part of the cost of running the department, and the cost of training them is a charge against the employment department. Those who say that the number of replacements should be used as a basis of calculation agree with those who use the number of men hired, but add the proviso that only those men should be figured into the labor turnover who are hired to replace men leaving. For example, if the shop is growing in size, they do not feel that it is fair to have the labor turnover increased and for the employment department to accept a charge against its efficiency, when the change is caused by the growth of the company's business.

In a case of a growing organization, the results of figuring the turnover by each of the three methods mentioned are shown in the following calculations in which it is assumed that there are 1,000 men on the pay roll at the beginning of the year, 1,500 are hired during the year, 1,000 leave, and 1,500 are on the pay roll at the end of the year, the average force being 1,250.

By the first method, the percentage of turnover would be:

$$\begin{array}{rcl} \text{Men hired} & 1,500 & \\ \text{Average force} & 1,250 & \\ & \hline & = 120 \text{ per cent.} \end{array}$$

By the second method,

$$\begin{array}{rcl} \text{Men leaving} & 1,000 & \\ \text{Average force} & 1,250 & \\ & \hline & = 80 \text{ per cent.} \end{array}$$

By the third method,

$$\begin{array}{rcl} \text{Men hired to replace others} & 1,000 & \\ \text{Average force} & 1,250 & \\ & \hline & = 80 \text{ per cent.} \end{array}$$

Now suppose that business is depressed so that it is necessary to reduce the force the next year, and that there are 1,500 men at the beginning, 1,000 are hired, and 1,500 are lost or dropped, leaving 1,000 at the end of the year. Then, calculated by the different methods, the percentages of turnover would be:

By the first method,

$$\begin{array}{rcl} \text{Men hired} & \frac{1,000}{1,250} & = 80 \text{ per cent.} \\ \text{Average force} & & \end{array}$$

By the second method,

$$\begin{array}{rcl} \text{Men leaving} & \frac{1,500}{1,250} & = 120 \text{ per cent.} \\ \text{Average force} & & \end{array}$$

By the third method,

$$\begin{array}{rcl} \text{Men hired to replace others} & \frac{1,000}{1,250} & = 80 \text{ per cent.} \\ \text{Average force} & & \end{array}$$

From the foregoing it will be seen that the first two methods give opposite results under changed conditions, but that the results of the last method are alike for equal changes, whether the change is an increase or a decrease. From this, the last method seems to be much the fairer to the employment department, whose work is judged by the rapidity of turnover shown by its figures. Moreover, the method seems the fairest to the shop, as it is by no means the fault and not always to the credit of the shop that business falls off or picks up. However, labor turnover figures are for a guide and a warning only.

Whenever business is going down in general, the labor turnover necessarily decreases so far as the number of men leaving of their own accord is concerned and increases in the number of men discharged or, to use the common fiction, laid off. When business is on the mend in general, labor turnover mounts up, because of the rashness with which firms coming out of a depression bid for help.

Further variations in figuring turnover occur in the exceptions from the numbers in the numerators of the fractions shown in the foregoing calculations. Almost every one leaves out the number of employes dying, as being outside the power of the shop or employment office to change. Some leave out, in the case of female employes, those leaving on account of marriage, or on account of approaching childbirth. Exception is also sometimes made in the case of young people who leave because their parents are moving from the city and they are obliged to go too. Then, in some lines of business there





# RECORD OF TURNOVER

COMPANY \_\_\_\_\_

Date	ENTRANCES												LEFT OF OWN ACCORD									
	NEW				RE-EMPLOYED				TRANSFERRED				WORKING CONDITIONS						LOCATION		OTHER	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	1	2	1	2
	Experienced	Learners	Laborers		Experienced	Learners	Laborers		Physical Reasons	Promoted	Failed	Departmental Fluctuation	Wages	Heavy, Wet or Dirty etc.	Ill Health	Monotony			Family Moving	Housing Conditions		
1																						
2																						
3																						
4																						
5																						
6																						
7																						
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To Compute Percentages  
DIVIDE TOTALS BY "DEPARTMENT AVERAGE for MONTH"

Number of Em  
in Departm  
Day of

DEPARTMENT \_\_\_\_\_

MONTH \_\_\_\_\_

FOREMAN \_\_\_\_\_

YEAR \_\_\_\_\_

## EXITS

EXITS																							46	47
DISCHARGED										LAID OFF				TRANSFERRED				UNAVOIDABLE				TOTAL ENTRANCES	TOTAL EXITS	Date
21	25	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	DEATH							
Incompetent	Unreliable	Liquor	Trouble Breeder	Insubordinate	Misconduct		To Decrease Force	Physical Reasons	Temporarily Employed		Physical Reasons	Promoted	Failed	Departmental Fluctuation	Pensioned or Superannuated	Marriage (Female) or Pregnancy	Exterior Causes	Occupational Causes						
																						1		
																						2		
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																						4		
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																						or		
																						TOT		
																						%		

Last Day  
of this

Month: \_\_\_\_\_

Department

Average

for Month: \_\_\_\_\_



is an emergency force hired for a brief period only, as in a department store around Christmas, and in hat shops near

Day \_\_\_\_\_  
Night \_\_\_\_\_ 192 \_\_\_\_\_

TURNOVER BY CLASS OF WORK AND CAUSE

Cause of Leaving		Class of Work					Length of Service					Sex		Color		Totals	Percent of Turnover Due to each Cause
		Unskilled	Semi-Skilled	Skilled	Foremen and Assistant Foremen	Shop Clerical	Less than One Month	Over One Month and less than Six Months	Over Six Months and less than One Year	Over One Year and less than Five Years	Over Five Years	Male	Female	White	Colored		
Discharged	Careless, Unreliable, Lazy																
	Incompetent																
	Insubordinate																
	Quarrelsome																
	Irregular Attendant																
	Miscellaneous																
	Total Discharged																
Laid Off	Physical Reasons																
	To Decrease Force																
	Total Lay Off																
Voluntary	Pay (More Money etc.)																
	Work Conditions <sup>Dusty</sup> <sub>Dirty</sub>																
	Lives too Far, etc.																
	Account Night Work																
	Poor Health																
	Unknown																
	Miscellaneous																
	Total Voluntary																
Died																	
Total Exits																	100
Average Working Force																	X
Turnover																	X
New Employees: Men - _____ Women - _____																	
Remarks _____																	

FIG. 2

the close of the season's work. It seems reasonable to consider that when any one hired for a definite period fills out that time the employment department has a perfect record

in respect to that case. Certainly the employment department should not be charged up with inefficiency because the period for which the help is wanted is less than a year. In general, when figuring employment-department efficiency, it seems right to leave out of account all cases in which no effort of the employment department could have kept the man who leaves. To be sure, when employes die or their parents move away, their successors have to be trained for the job, but such employes are in the same class as those who are hired and trained for the work they are to do because of the growth of the firm's business. A form of record showing daily and monthly labor turnover and the causes is shown in Fig. 1. A form of summary of turnover records is shown in Fig. 2.

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## METHODS OF REDUCING LABOR TURNOVER

**4. Desirable Rate of Turnover.**—It should always be borne in mind that it is possible to reduce labor turnover to too low a rate for the good of the shop. A very low rate is likely to mean that the average age of the employes is too great, as men lose their desire to go from place to place as they grow older. It may also mean that not enough production is called for, that the foremen are too easy with the men, that discipline is not maintained, or that higher wages are paid than circumstances justify; all these things are possible and costly. However, very few shops have to consider turnover from this point of view, as almost all of them suffer, whether business is good or bad, from an unnecessarily high turnover.

It should also be borne in mind that the employment department by its own efforts is seldom in a position actually to reduce labor turnover, and that, as it is usually an advisory department, a part of the staff rather than the line in the organization, it can only present reasons why things should be so changed as to make the needed reduction. It is also safe to assume that no one thing will cut down the turnover to any great extent. There is no panacea, and there appears to be no way to predict absolutely what will be most effective

in a given case. Among the many things that have been tried with varying degrees of success under different conditions are combinations of employers, various forms of welfare work, and education.

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#### COMBINATIONS OF EMPLOYERS

**5. Methods and Difficulties.**—One of the favorite means which has been tried for reducing labor turnover, especially in moderate-size cities, is a combination of employers. Such a combination is an association of employers who are willing to pledge themselves that they will not hire one another's men without the permission of the former employer. Practically such a condition pertains in the government service, where there is a rule that no one can change from one department to another except at the same salary, and that any one who changes is not eligible for an increase in salary for 6 months after the change.

There are two things that make it almost impossible to maintain such an agreement under ordinary business conditions. One is, that in times of scarcity every member suspects that the others will take some chances to get help. He therefore believes that, the action of none of them being entirely defensible, no one will dare to take action against another who interprets the agreement liberally to suit his own needs. Consequently, when one employer finds it necessary to recruit, he takes whatever men apply and say that they will not again work for the other member, whose shop they were in up to that day. The other thing that makes it impossible to carry out the agreement between the members is that it gives so great power to an unscrupulous foreman, that abuses are likely to turn every one against it. For example, if a man is hired in one shop under an agreement that if at a given time he is worth more money it will be given him, and he is passed over at that time and given no satisfaction, he should have a right to go out and get a job wherever he can. If his foreman tries to prevent his getting this job elsewhere, then the system is being flagrantly abused and almost every one except the prejudiced foreman will see it in that



light. As a matter of fair play, it seems that it should not be necessary for him to have the approval of his present boss before getting a new job. Most foremen are entirely human, and they will find ways to show that a desirable man is only desirable for the job with which he is occupied.

6. A more legitimate combination of employers is one that sets standard rates for certain classes of labor, as, for example, a uniform rate per day for men who shovel coal over the sides of gondola cars, a given piece rate for knitters of men's socks, or similar definite jobs. Such rate setting is done successfully inside the shop, in fact it is one of the first jobs of the employment department to call attention to discrepancies in rates of pay in different departments. But, where different firms are concerned, such arrangements are very difficult to keep going after they are started, for reasons similar to those that apply to the form of employers' combination already described. Firms will enter the agreement and then after a little time promote new employes and raise their wages so soon as practically to violate the spirit of the agreement. An illustration of such a situation was presented by the operation of the Shipping Board during the World War. In some shipyards laborers received one rate and helpers to other mechanics a higher one, and many yards took advantage of the opportunity to rate most of their laborers as helpers, thereby obtaining an advantage over the firms that followed the spirit of their instructions.

7. The only circumstances under which combinations of employers are likely to be successful are in small communities in which all the shops that compete for labor put their employment work in the hands of a community employment department, and standardize their requirements exactly as is done within a single establishment. From the ethical standpoint, no objection to this form of organization can be made except when it is used to prevent earned increases in wages or promotion. Unfortunately the same jealousies and selfishness crop out in all these associations as in single shops, and are less likely to be controlled. Inside one shop, there is the pos-

sibility that the superintendent will take hold of a case where one foreman refuses to allow one of his subordinates to be promoted to a better job in another department, and will make the promotion. In an association of shops this is not possible, and superintendents will accuse one another of stealing help if overtures are made to any one to move from one shop to another; in other words, there is great danger that the growth and prosperity of a small community may be jeopardized by the selfishness of one superintendent, unless all the others take a broad view of the situation and insist on enough circulation of men from shop to shop so that stagnation will not set in. The moment a man comes to feel that he is helpless and that he cannot move to another shop without the permission of his own foreman he feels a resentment against the town for making such a condition possible. The only ethical and profitable combination employment department is one that shows sufficient self-restraint to give employes large choice as to working places. The preferences of the employes will show plainly their opinions of the different firms, for there will invariably be one shop in any town which is considered the best place to work in by the majority of the workmen and another that is considered the least desirable, with the rest rated in between.

If wages are alike for the same work in all the shops, the best workmen will gradually drift to the best shop and the worst to the worst shop; for then the non-financial rewards begin to be felt most strongly. The effect of this is still further to standardize working conditions, as the poorer shops will find that they do not attract the men they need, and will attempt to bring up their conditions so as to get them. If this results in such conditions that the men who leave town to get other jobs come back and declare that there is no better place to work in, then the result of the combination is justified. If, on the other hand, the result is that the best workers go from town and never return except to take others away with them, then the combination is deservedly a failure.

## WELFARE WORK

**8. Nature and Purpose of Welfare Work.**—In shops where the labor turnover is thought to be too high, an effort to reduce it is often made by resorting to so-called *welfare work*. This term has come to have a meaning much broader than it should. Its real meaning is work done to direct employes to a better use of the money which they earn, toward thrift, cleanliness, and good home life; in fact, an attempt to get workmen to enjoy the things which generations of restraint have made enjoyable to the so-called higher circles of society. The object is entirely commendable, but the way the work has been done makes it very difficult to do the legitimate things which might come under this head. The great difficulty is to eliminate paternalism; and the greatest difficulty in doing that is to get people who are paternal to realize what they are doing.

Paternalism may have a great range of meaning. It simply means *fatherly control*, and there are many types of fathers, but in general it conveys the idea of a father who retains his legal control over his children and acts the part of a benevolent despot. There are a great many people who like to be treated in just that way, but it is not a wise father who retains this control and who thinks for his children up to the day they are of age. Their own self-control and initiative need encouragement and development, which they do not get unless paternalism is exercised with good judgment. The situation in a shop may be very similar to that in Cuba, where the United States government began in a very paternal manner but gradually relinquished control of the native government until finally it was possible to let go altogether. So, in the shop, paternalism is justified only as it is helping people to get along without it.

It is very difficult for a man who has the money-making instinct to sit still and see other persons fail to be thrifty. He feels that it is part of his duty to reform them. By *reform* he means, of course, making them like himself. They may envy him his wealth, and yet down in their hearts they may

despise him for the way in which he has accumulated it. By his very position, he is unable to get their attention to his ways of becoming wealthy. On the other hand, a great deal of what is done under the name of welfare work is acceptable to employes under some other name, and under leadership rather than compulsion. The old saying that you can lead a horse to water but you cannot make him drink applies doubly to men. If they see one of their number prosper and show signs of it, they are quick to try the same thing, whether it be a get-rich-quick scheme or something legitimate; but let the owner of the shop propose that they invest in the company's stock and he will find that they suspect all sorts of schemes on his part, from a plan for getting their hard-earned savings away from them to a scheme for getting them tied up to the shop so that they cannot afford to take any other job. So, first of all, it may be said that the general manager or any of the higher officials are, by their position, debarred from taking a successful part in legitimate welfare work.

Some plans for welfare work that have been tried with varying degrees of success are described in the following pages.

**9. Mutual Benefit Associations.**—Probably mutual benefit associations have the highest percentage of success of any of the activities that come under the head of welfare work. They are very much alike in their methods, the variations appearing to be immaterial. From study of many of them, it appears that the elements in common which seem to lead to success are: (*a*) Control by employes; (*b*) small frequent payments; (*c*) moderate benefits; (*d*) payments large enough to allow occasional dividends and to render extra assessments unnecessary; (*e*) limited social activity.

**10. Control and management by employes** seems to be the most important essential. To be sure, many of the most successful associations elect the cashier of the company to be their treasurer, but they put him under bonds to them for this work, just as he is under bonds to the company for its work, and then, too, he is an employe and eligible to member-

ship. Most companies allow the elected officials of the association to spend a reasonable amount of time during working hours in collecting dues and making disbursements. Some companies go so far as to collect the dues by taking them out of the pay envelope, but this is not always found best. As soon as a man finds something taken out of his pay envelope he gets to think of his pay as what he finds in the envelope and to forget that what is taken out ever was his. Consequently, he gets to thinking in a perfunctory way about the association, and soon loses interest and allows it to be run by whatever clique may happen to have control at the time. Cliques kill any such organization without fail. It is much better for the company to allow the official of the association time enough to collect the dues whenever they fall due than to collect them from the pay envelopes. When a man receives his money in full and then pays out even a little of it under agreement, he realizes plainly that it is for something in which he has an interest and in which he may take a hand.

It is found very helpful not merely to have employe control, but to provide in the constitution that employe control shall rotate; that is, that all the officials shall hold office only for one or two terms, enough staying in office to pass along the necessary traditions to the next comers. The exception to this rule is the treasurer, who is likely to be a steady incumbent. Inasmuch as his functions are usually purely to guard the funds and distribute them as directed, this is a reasonable plan.

**11.** Frequent payments are desirable in order that they may not be easily forgotten. Some will want to pay up a year ahead, some may offer a 5-year payment, but the great number should pay at least as often as once a month, and in some ways it is better that they should pay as often as the pay day comes around. There will be a temptation to make the pay clerk the collector for the association and to have him collect as he pays, but this slows down the paying off of the help too much, besides not letting the employe have the money long enough to realize that he has had it.

**12.** About half the successful associations collect 25 cents per member once a month (pre-World-War rates). This rate allows payments of about five or six dollars a week during illness and a death benefit of \$100; and, if the business of the association is well cared for and no epidemics occur, it will allow a slight accumulation of surplus, or an occasional dividend back to the employees. Payment of dividend only to those who have been members for some certain length of time, or adjustment of the dividend according to the length of time each member has been contributing is advisable, as a dividend to all present members alike is not altogether fair to the older members who have really made the dividend possible. It is undoubtedly wise to pay occasional dividends if possible, and actually to *pay* them, not by remission of a month's dues, but by payment in cash from the treasury.

While war prices were in force, the rates and benefits were in many cases doubled and the dividends also increased. The increase of dividends was partly due to increased labor turnover, for a high rate of labor turnover adds something to the surplus, as no provision is usually made for refunding any money once paid into the treasury, and consequently a greater number of members forfeit membership by leaving during times of business prosperity. Some associations permit employees who leave the shop to retain their membership so long as they send their dues without having to be asked for them. This privilege, however, can hardly affect the total collections very much, as only a few persons remember to keep up payments after they begin to make friends in the new shop.

**13.** Most organizations have a proviso that the total payments made to any member shall not, when added to all that other organizations contribute, amount to as much as his regular income. This is to prevent malingering; but it is not always enforceable, as men do not always let all of their affiliations be known. Under workmen's compensation laws, certain sums are paid in case of accident, and the association will be called upon to make its usual payments. If, then,

the total the man receives slightly exceeds his usual income, a certain leeway for actual loss to the family may well be allowed, as a man's wages are by no means all that he contributes to his family's comfort. He undoubtedly does much around the house that will have to be paid for if he is not able to do it himself; there will at least be walks to shovel and ashes to take out, and little odd jobs around the house which cost a great deal of money to have a plumber or tinsmith come and do. Then there are almost always doctors' bills, extra expensive foods and medicines, which are not always covered by the compensation laws.

14. The death benefits of employes' benefit associations are very seldom intended to amount to more than enough to pay funeral expenses. This may seem like very little to those who carry their insurance by the tens and hundreds of thousands, but to a workman's family it is worth a great deal not to have this additional burden just at a time when the world looks darkest.

Often mutual benefit associations, acting under suggestion from some member of the firm, have increased the dues and the death benefit, or they have made two or more classes of members and benefits, but the associations with moderate dues and corresponding death benefits have been the most prosperous. The reason for this probably lies in the fact that life insurance, in any but very small amounts, does not sell itself. It is seldom that a man contemplates seriously the prospect of his own death. He may see his fellows succumbing to disease, but he thinks that it will not touch him, or that if it does it will not harm him. It is fortunate that we have this happy disposition, as otherwise we would not likely have so low a death rate as we do; but it makes the selling of life insurance an art that is not possessed by mechanics and factory workers in general. Moreover, much more time will be required to sell thousand-dollar policies, for example, than most firms could allow their employes to take. At pre-World-War rates, \$100 to \$150 death benefits seemed to be about the limit for successful



operation; these amounts were successfully doubled during the war, but they will probably have to be approached again as conditions change.

**15.** The statement that only a limited amount of social activity is desirable in connection with a mutual benefit association may seem at first sight to require explanation, but experience has shown it to be true. People who work in the same shop necessarily see a great deal of one another, perhaps more than is good for them, during working hours, at noon, and going to and from work. Their homes often are widely scattered, and any attempt to bring them together in a social way, in the evening or Saturday afternoon, or on a holiday, finds them more anxious to have the time to spend with friends whom they cannot meet every day, and whose peculiarities have not sufficient opportunity to jar on them to such an extent as to make the meeting unpleasant. Those who are brought out by mutual benefit socials or shop socials are of two types; one, those that do not get such invitations from any other source, who are hungry for social meetings, but do not know how to enjoy them because they do not know how to entertain or give pleasure to others. The other class is composed of those who go to everything, even if they have to take in two entertainments in the same evening. They take great enjoyment in these meetings, but do not contribute much to their success.

The exception to the rule limiting the social activities of welfare organizations, is when the employes of a shop by themselves constitute a whole town or village of enough size to justify socials among neighbors who live near one another and in a place where moving pictures do not form a serious competition. In such a community, every one plans for, and looks forward to the next dance or entertainment, and every one goes that possibly can, and the whole effect is good, except for the slight loss in production for the few days before each party. The good which is done to the morale of the whole body of employes is usually worth a great deal more than this loss, however.

**16.** What part in these entertainments the officials of the company should take is a much discussed question, at least among employes who cannot possibly influence it. There is always the danger that the officials will put something of a damper on the proceedings. People who are not well versed in all the rules of polite society can get a great deal of enjoyment out of life, nevertheless; in fact, it is likely that they get more because of their very lack of knowledge of conventionalities. If the officials are society people, their attendance at these functions is a decided drawback, unless they are able to forget their positions. If, however, they really rose from the ranks, and especially if their wives did also, then there is not much danger but that they will be glad to leave their dress suits and their dress-suit manners at home for an evening and come out for real enjoyment; but if they have not come from the ranks they do not accomplish much by appearing before the workmen in their stiff and restrained manner.

**17. Group Insurance.**—It is almost inevitable that the rate of labor turnover will be less among the members of a mutual benefit association than in the rest of the shop force. This is not altogether because of the association, but more likely because those to whom such an association appeals are the type of people that stop and think before they leave a shop. Whatever the reason, the fact remains that labor turnover is less in this class of employes than in others, and because of this the management may very likely determine to try one stage more of progress by taking out a blanket policy of insurance on the whole shop force. The reasons for this appear to be as follows:

(a) If a small amount of insurance is good, more will be better. (b) Insurance costs less at wholesale than at retail. (c) Insurance companies, knowing their business as they do, must be safer and more dependable than amateur associations. (d) The company can put in its credit, and some money, and thereby give each employe an insurance policy at a very liberal rate, thereby doing good for the workmen and gaining credit for itself.

18. There is little doubt that if a small amount of insurance is good more will be better, and that most workmen carry altogether less insurance on their lives than they are worth to their families. A workman who averages to bring home \$1,000 a year through his life is nearly as good, from a purely financial standpoint, as an investment of \$20,000 at normal rates. Moreover, he has a sporting chance of some day being worth much more than the thousand dollars a year. If he invests this money in bringing up a family of children, he may be looked on by his employer as a thriftless chap with no ability to save his money, whereas these children may in 20 or 25 years prove to be worth a great deal more than any life insurance that he could possibly buy. The old and much maligned term policies were not a bad thing for men who were spending all they could get together in bringing up and educating their children. The rates were low and the policy gave the mother assurance of some money to carry her along while the children were little and not able to aid in supporting the family.

19. The second assumption, that insurance costs less at wholesale than at retail, is also true, if limited to the cost of insurance; if it takes in the cost of selling the insurance the statement may not be true. Very large policies may not cost a great deal to sell, but policies moderately large as compared with the insured's income do require a great deal of labor and watchfulness to keep them in effect. The mere fact that a firm makes each employe a present of an insurance policy does not mean that the policies will be kept up. To be sure, if the employe is willing, the paymaster may take out the premium each week or each month, and the policy may be continued in that way; but labor turnover comes into play again, and each man who leaves the shop may reasonably be expected to give up his policy.

In the case of the mutual benefit association, the amount paid in is so small that no one ever suggests getting his money back; but if the corporation is handling the insurance the chances are very strong that some one will put the matter up

to the management and they will be practically forced to make some restitution. Such a condition is in many cases provided for in advance by giving each man an opportunity to carry on such part of his insurance with the covering company as his premiums have so far paid for, or, by increasing his premiums, to carry as much insurance as before. Most such policies are, however, issued without physical examination by the issuing company. If the employer has a medical staff and a system of physical examinations, then the policy may be issued on a basis of the excellence of this examination and on its frequency; but the greatest value is in the fact that such a company examination makes certain that men will not be placed on jobs that will aggravate their ailments if they have any.

It is doubtful if there is any very special drawing power in insurance, whether of the professional group type or of the more amateur association type. On the other hand, the effort toward promoting such insurance is very likely rather to be resented as being too paternal. If the insurance were made optional and only sold to those who want it, then all the expenses of sale would have to be borne and the cost of insurance would be very little less than if separate policies were sold. More than that, it would be necessary to allow the insurance company's agents access to the employees during working hours. Also, not every employe cares to have the company for which he is working select the insurance company in which he shall insure. His wife may not like the calendar that they sent out last year or the man may have heard some rumor to the effect that the insurance company did not allow the full claim for some one who died, who, through no fault of the beneficiary, had failed to live up to the letter of the policy. The fact that the employer pays some part of the premium himself has very little effect on his employes. They usually feel that they would rather have the money and freedom to spend it as they please.

All in all, it seems very doubtful if group insurance, good as it is, has any decided influence in making any given job any more attractive to employes.

## SENIORITY SYSTEM OF PROMOTION

**20. Job Insurance.**—A definite line of promotion and seniority rights is a favorite method for promoting low labor turnover, especially among railroads and other public service corporations. This system presupposes fitness, or rather it demands fitness, for the rule is inexorable. If a man cannot do the job to which his seniority entitles him, he is automatically shunted, either out of the service altogether or into some place off from the main channel of promotion and where promotion is not considered. The system proves to be very effective, especially where provision is made so that men can obtain what practically amounts to a leave of absence without loss of seniority. This leave is sometimes as long as 6 months. If a man sees a job that he thinks is better in some other line, he can go and try it for that length of time, then, if he discovers that the old job was best, he can go back with his rights of promotion unimpaired. This rather loose string on a man is a very fortunate provision, because the seniority thus becomes a privilege instead of a penalty. Men can go out and try their hand at something else and not have demotion in order to get back in as is the case in so many industrial corporations. The system is not, however, adaptable to all organizations, because some have so many parallel lines of progress that no one knows whether he is being promoted or demoted. For example, in the manufacture of wire and wire specialties, no one can be sure whether a transfer to or from the black-wire work to galvanized or to cold-drawn work is a promotion or not, except as it is revealed in the pay envelope. Even then, there may be no other basis for the variation in rates except precedent.

Instances have been known where a foreman discovered that workmen under him were getting more pay than he was, and where an assistant foreman was on a higher salary than the foreman. Such things are discovered and become common knowledge in the shop before the management has any suspicion that they have leaked out, and they produce an impression directly contrary to that made by the seniority

rating. The cure for this trouble is simply common ordinary honesty. No management that gives a subordinate higher pay than his superior does it with any thought of being dishonest in the narrow sense of the word. They usually feel that they have been held up and forced to pay the larger amount, not because the man was worth it, but because some competitor, ignorant of what the rate should be, attempted to hire the man away from them. However, it is doubtful if it very often happens that a firm pays a larger salary than they believe is earned for any considerable length of time.

In view of the success of the railroad plan of seniority, it seems as though steps to map out lines of progress so they will be apparent to workmen would be a great advantage to any shop. Unless a man has something to look forward to, he becomes an old man in the company long before he should. If he knows what the next step in his progress should be, he has no excuse for not fitting himself for it.

**21.** There are two flaws in the seniority system, however, which should not be overlooked. One is the damper which it puts on the highly intelligent man who might, on a purely merit system, rise much more rapidly than he can go with the current. He feels that waiting for dead men's shoes is too slow for him, and he gets out and goes elsewhere. The consequences of such action are not all bad, however. It results in a force the higher men in which matured late in life, and are thereby likely to retain their efficiency longer. Consequently, among them are found many men who are well past middle life and yet able to hold their own and more with other business men. Then, too, the seniority system makes for thoroughness. Under the merit system of promotion a young man of promise is likely to be pushed ahead so fast that he has anything but a thorough knowledge of what he has been over and through. Many firms that might have used a little more of the seniority method to advantage, appear to be suffering from this mania for new blood.

The other objection to the seniority rule is that it puts so great a premium on staying with the organization that men

are more inclined to hang together to get their wage increases and other advantages than they are in a shop where there is a more active flow of men. This is equally true whatever the means of reducing labor turnover. The more desirable the shop as a place to work in, the greater the tendency to unionize from within. If this tendency is confined to the shop itself it is not a bad idea, in fact it is being cultivated in the form of shop committees, etc., by many large and prosperous firms with a considerable promise of success. It has been said that a strike is a compliment to the firm as indicating that the workmen prefer to hang together and lose some time from work rather than give up their jobs individually and secure others.

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#### HOURS OF LABOR

**22. Length of Working Day.**—So much has been said about the 8-hour day, that it appears to the public mind to have an importance that it does not possess in the minds of workmen. Length of hours is of importance in two principal directions; the first, as to the fatigue from which a man will recover over night; the other, the demands of his social circle.

**23. Fatigue.**—Fatigue may be either mental or physical, or both. We usually think of physical fatigue only, when considering shop conditions, but there are a great many shop jobs that require as high an order of intelligent concentration and mental effort as any in the office. Physical exertion does of course use up energy. If it uses up more energy than food and sleep replace, then the man is wasting himself just as surely as if he were throwing away the money he receives. This is not merely his loss or that of his family. It is a loss to the firm for which he works, for it inevitably shortens his working life. Fatigue is not altogether a matter of the amount of work that the firm sets for a man to do, as the firm has no control of the food with which the waste is to be replaced, neither can it control his digestive apparatus, nor regulate the sleep that he shall take. A great deal has been done by



newspaper and magazine articles to promote good health, but much of this work has been undone by the ability which large wages have given for men to eat expensive and indigestible dishes, and expensive habits of the palate are not easily overcome.

In one way, a large amount of hard manual labor may have a less unfavorable effect than a moderate amount; because, when a man gets home at night tired through and through, he gets to bed and to sleep before the half-tired man has made up his mind just how to while away the evening. In fact, the man most likely to suffer from fatigue is the one who has never done work enough to cause real fatigue, and whose muscles are soft and flabby from disuse, but who is suddenly called on to help at some heavy work. Soldiers returned from the World War showed a curious illustration of fatigue. While they were in camp or overseas they were on a stated ration, they had regular hours and a great amount of hard work at certain times and nothing at all to do at other times. When, however, they came to live in their old way with their families, they gave up their fresh air and their stated ration, but they retained their proclivity for jumping from one thing to another. That is they had great difficulty in settling down to steady work at any one thing.

24. Where great fatigue is experienced, and especially where the fatigue is mental, rest periods at somewhat frequent intervals have been found advisable. The length and frequency of rest periods for some forms of laborious work, like handling pig iron or shoveling coal, were very carefully worked out by Taylor; but his results would be helpful in other cases only in a general way. There is no stated period of working and of rest that is best for any two men, or best for the same man any two days; for the man's mental attitude has so much effect on his feelings that his temperament is often of more importance than his physical condition. A study of the nervous system shows that fatigue is simply a nervous condition that warns a person of his approaching physical condition. If his nerves are overwrought and tired,

he feels the warning before he is physically tired at all; and yet the warning is just as real to him as though he were doing something arduous. On the other extreme, in a football game, for example, the same man might fail to notice these warnings from his nerves because they were too busy conveying his instructions to his muscles to send any messages back. He might, therefore, by not heeding these warnings, fail to take rest when he should, and thus work himself permanent injury.

Mental fatigue should never be allowed to become acute. Every man has a limit to the overload which he can carry, and once he has approached that limit and knows where it is, he should keep away from it. We are said to be a nation of neurasthenics, and the accusation is more likely to be increasingly applicable than not. Our tendency to flock to the cities, and to so accustom ourselves to noise and confusion that we cannot sleep in the country because the quiet hurts us, is all wrong from a purely psychological point of view. We undoubtedly shall have to go all the way through with this experience before we realize that life is worth living without getting into our own hands every last penny that we can scrape together; but so long as we estimate all values in dollars and cents we are probably doomed to neurasthenia. This malady is not, however, especially helped by rest periods. It needs merely a slowing down of all nerve-racking work and an improvement of annoying surroundings. Moreover, a great part of the things that produce nervousness are not within the control of the employer; for it is difficult to locate any but the largest plants at a distance from a large city, because the very people who suffer from overwrought nerves insist on being where the conditions tend to make them more nervous.

25. Another plan, which has the advantages of a rest period and appeals better to the office force, is a general airing of the rooms accompanied by mild calisthenics. This plan is often installed, is liked by nearly every one, but soon is forgotten and dropped. The only way it can be kept up is

to order an absolutely callous janitor to go the rounds of the office at a certain hour and open every window wide and see that they are not closed for a certain length of time. Then the exercise becomes necessary as a preventive of colds.

**26.** A great many jobs furnish their own rest periods, in fact there are not many that do not. A drop forger with a helper to see that new pieces are put in the forge can work continuously if he wishes, and his work is certainly laborious enough. He also has the disadvantage that if he stops to rest he is likely to catch cold. The old-time blacksmith, of whom a few still persist, had plenty of opportunity to rest; because while he was pumping his bellows he used another set of muscles than those he used when hammering iron. The jobs that do not of themselves allow rest are so few in number that each one may have special study to determine just what should be done for it. Sometimes the difficulty can be solved by a double gang alternating in two- or four-hour shifts, other cases require a somewhat shortened day, and still others simply need better selection of men who are willing to take the necessary time to sleep at night to recuperate for the next day.

### **27. Social Demands Affecting Hours of Labor.**

Every married man owes something to his family besides the cash which he brings home on pay day. If he simply treats home as a place to sleep and get two meals, he does not deserve a family. The employer who makes his hours so long as to require such a way of living is not contributing as he should to the future welfare of the nation. To be sure, there are always men who are willing to take what are practically watchman's jobs of 12 hours a day for 7 days a week. They are men who need the money, who have no trade either because they are not capable of learning one or have not the necessary ambition. Sometimes they are men with families which they desire to see as little as possible, but that is very much the exception.

Hours of labor were not reduced in many cases because men would not work longer hours. When the 8-hour day came,

it amounted only to 10 hours' work with pay for 11 hours, as all time over 8 hours was to be paid for as time and a half. This bargain, of getting something for nothing, was what impressed workmen the most. Naturally, in the course of time the effect of demand and supply determines the hours of labor within the limitations of men's strength, and so as to allow the workman a reasonable time for the social side of his life. When there is a great deal of work available and the rates are necessarily high, some men will work long hours, even if it is necessary to take two jobs, one in the day time for one firm, the other at night for another; but in times of slack work the general run of employes are reconciled to dividing what work there is between the men who most need it for their families, consequently still shorter hours become inevitable. Experience shows, however, that nearly all men are more concerned about the number of days which they work each week than about the number of hours each day. If a shop must run only half time, nearly every one will agree to work only 3 days a week where no one would like to work every morning or especially every afternoon. Again, if the number of hours per day is decreased, there is almost always a movement to try to get Saturday wholly clear in order to make a much longer week end. This is of a great deal more consequence to married men than a corresponding shortening of each week day. Even with daylight saving in force, the length of time men have to themselves is not sufficient for them to do much gardening unless the gardens are very near both work and home. Where such is the case, a great deal can be accomplished, but where workmen are commuters, as so many are in large centers, gardening must be done Saturday afternoons and Sundays. The commuter does not get home until the middle of the afternoon Saturday, whereas if he had all day Saturday he could begin work early in the morning and have his Sunday for rest and recreation.

**28.** There appears to be no very good reason why different hours should not prevail in different parts of an establishment, according to the nature of the work. In some fac-

tories where the day's work is limited by the equipment, as in the manufacture of rubber shoes, all the employes begin work at the same time in the morning, but they go out at various times during the afternoon as their allowance of work is completed. If a workman wishes half the afternoon off, all he has to do is to keep his mind on the job, and if he can do the work well and also rapidly he may be out in the early hours, while any one who finds it easier to work slowly and methodically can take the whole day for the same job.

In some instances it may be necessary that the work be carried on continuously, in which case there is the choice of three gangs working 8 hours each, or one gang working 10 hours and a night gang working the other 14. If the night gang is made up of single men, as it should be, it is often more satisfactory to divide the work in this latter fashion. Then the day gang gets the same hours as are common in other shops, and the night gang, which is debarred from all ordinary social activities by virtue of being a night gang, has long hours and correspondingly large pay. A night gang made up this way necessarily has a large labor turnover, but the total turnover for the 24 hours a day will almost certainly be less with this long night shift than it will with three gangs, or with two gangs of 12 hours each, or with two gangs alternating day and night.

This latter plan is often tried in order to start a night gang. The original day gang is split into two parts and the men draw lots as to which gang shall take the first week of night shift. The losers are promised that they will have the day shift in one or two weeks, as the case may be, so that they will only have a short time of discomfort. Then each gang breaks in enough green men to make up their numbers. It soon appears that the men who have once been on the day shift feel that they should continue. They find that it takes them at least 2 weeks to get accustomed to sleeping in the daytime, then they go back on the day shift and it takes them a few days to get accustomed to sleeping at night. The result is that they have about 4 or 5 comfortable days and nights each month. They become sore and disgruntled and leave rapidly

or as soon as they can get another job, and the labor turnover is high, as is also the cost of breaking in new men. In any large city when things are prosperous, there is always a large contingent of night workers in every employment office on Mondays trying to get day jobs rather than go back to work Monday night again. On the other hand, a continuous night gang will have a large labor turnover, but not so large as that which results from alternating the gangs day and night.

29. In conclusion, it is safe to say that there is no great pressure from workmen themselves for a shorter day than 10 hours; that their preference is for reduction of the hours per week rather than per day, and that they would like to get Saturdays clear, if the hours are brought to 50 a week or less. Further, it seems that special hours for special work are feasible; and that the three 8-hour shifts are not desired by the workmen, for even under war stress it was very difficult to fill the 11 P. M. to 7 A. M. shift except by cleaners and repair men at exorbitant rates; and that different hours may be used for different gangs and different individuals without trouble, provided possibly that it is understood that requests for shifts from a gang working for one length of time to another gang working another will be given careful consideration.

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#### HELPING EMPLOYEES IN THEIR HOMES

30. **Purpose and Methods.**—Frequent attempts have been made by employers to help their workmen in their homes. Such action may easily be overdone, and it has often been very badly overdone so that it resulted in harm rather than good. In its mildest and most successful form such help consists in having a follow-up man visit the homes of men who are reported as being out sick, to inquire after the patient. If this man is tactful, and if he is given to understand that his value to the company will not be rated on the number of calls he makes, he may be able to make himself a most profitable addition to the force. In some shops, names of men who are absent and reported to be ill, either by fellow workers or

by their relatives or themselves, are given to the follow-up man each day and he visits them so far as possible and as soon as possible. If he drives up to the house in an expensive car with the name of the company plainly in sight, he will find out very little. If he comes on foot or in a rather dilapidated car of some make that is seen every day, he will probably get all the information that he wishes, except in those cases where a man has gone to another job and has sent word to the old shop that he is sick, so that he will not have to throw up the old job before finding out if he likes the new one.

A great many such men, and men who are staying out because they expect to be discharged if they go back, can be saved to a company by a good follow-up man. If, however, he carries his inquiries too far, if he looks into the diet on which the family is subsisting, and tries to give advice, or if he in any way steps over the line which marks the company's evident interest in the man, his work will soon become worthless. The man to do this work should be at least middle aged, preferably a man who has met a great many people and who is not shocked by things that are not entirely within the moral code prescribed by the Puritans. Ex-bartenders are said to make excellent men for this work. They are not easily deceived into mistaking sickness for drunkenness. Moreover, they have seen the seamy side of life and enough real examples of homes ruined by drink and jealousies so that they know what to say to a man who thinks he is out of luck.

**31.** The next stage in home follow-up is the employment of a visiting nurse, who may be either a woman or a man. If this nurse goes only to homes where the follow-up man has found actual sickness, and especially if she can go with the sanction or at the request of the mutual benefit association, then she can do a great deal of good. There have, however, been many cases where the nurse, being a good woman or man, but unused to the conditions of workmen's lives, was so anxious to do good that she did a great deal of harm by giving unsought advice. Once the follow-up man has made a satisfactory contact, and the nurse has shown her tact by



being helpful in a manner entirely professional, there is a good chance that overtures may be made by the man or his family for the advice which they would have resented if it had been offered unasked by an overzealous and officious welfare worker. The successful method seems to be almost wholly one of non-interference in private affairs, no matter what the temptation. It is true that many families of workingmen do not know much about living according to American standards. Also, as a part of their Americanization, it seems as though they should be brought in some way to give up their old-world customs and take up ours, and that the visitor from the shop could very well help in bringing this about. However, as will be explained in a later Section, under the head of Americanization, these suggestions come with better effect from others than representatives of the company. There is a perfectly natural suspicion in the minds of all employes that the company may be trying a little more than it should to make money out of them. Every attempt to secure greater production without at least a proportionate increase in money in the pay envelope is looked on as exploitation, and any apparent attempt to curry favor is looked on as a harbinger of new exploitation. For this reason, it appears to be wise to make the follow-up work from the employment department or the medical department very businesslike without the slightest hint of the expectation of any thanks for it.

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## EDUCATION

**32. Importance of Ability to Understand.**—One of the largest factors in increasing or decreasing the labor turn-over is the degree of understanding that employes have of their work, of the reasons for the various steps in the manufacturing, of why so much system is necessary in a large shop, why it is impossible for an employer to pay in direct wages all the difference between the cost of material and the sale price, and, in fact, of everything that may be classed under the head of shop economics. This understanding can be obtained only by education, which must, first of all, be based

on public-school education. The knowledge of a profession may be obtained in schools that are practically public; in a very few places some of the most common trades may be learned at public expense; and some shops have arrangements whereby they teach the particular trades and professions of use in their business to a selected few, in some cases by means of their own schools and in others through cooperation with public or semipublic schools. For these reasons, the public-school problem becomes a very real matter to every shop. Most shop managers, however, find it easier to complain about the product of the schools than to make constructive suggestions; but few such managers appear to have made enough progress with their own methods to justify the belief that they would handle the problem much better than is now being done. However, the problem is there awaiting solution, and it behooves the shop manager to take a part in it if he wishes to help bring the nation out of its present state of being only partially educated. More than half the labor troubles which manufacturers experience can be traced to misunderstandings. These have sometimes been the result of apparently intentional misstatements of facts by men who make a living by leading workmen; but the fact that misstatements can be made and repeated and be believed is proof enough that the people who believe them have serious need of more education of some kind or other.

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#### PUBLIC SCHOOLS

**33. Suggested Improvements.**—The results of a questionnaire sent to members of the National Association of Corporation Schools some few years ago showed conclusively that the members agreed in feeling that the public schools through the grammar grades should teach the so-called “three R’s” (reading, writing, and arithmetic), much more thoroughly than they do. When, as is now often the case, boys and girls go to school for 8 years and come out unable to read understandingly or so that others can understand them, cannot spell even moderately common words, and appear to have only a

hit-or-miss comprehension of the multiplication table, it seems as though the criticism made by the members was justified. The constructive part of this criticism was a pretty general suggestion that the other things on which time is spent during these 8 years, the "frills," be cut down or left out and that the effort be concentrated on the *three R's*. However, investigation does not show that these subjects were any better understood by pupils in the good old times when these shop managers were themselves in school.

The complaint in regard to the schools seems to be one of long standing. Moreover, it is one to which a great deal of attention has been paid by educators themselves. Their remedy is very simple, and one to which there appears to be a tendency to give some attention. It is simply to put teaching, as a profession, on a financial basis such that teachers with real ability will be attracted to it. Educators say that it is too much to expect that men and women of real teaching ability will accept salaries less than the cost of living, and continue to do so year after year, in the face of offers of double the wage from these very employers who are insistent on better teaching.

**34.** While the remedy offered by the educators is undoubtedly correct, the question still remains, "Just what will this better class of teachers do differently from those who now hold the positions?"

Two things appear to manufacturers to be important: First, a most thorough drill, so that it will be habitual for pupils to do their work correctly; second, the use of concrete problems that are commercially sensible, in place of the great number of abstract problems now offered. The first of these things could be done by the present teachers if time enough were allowed for them to do it. This time can be obtained only by change of the daily program so that more drill can be given on a smaller number of things. It is the second part of the program that gives the really serious trouble and that will continue to, no matter how capable the instructor.

The object in giving concrete problems is to arouse and

hold interest. Pupils, however, have varied interests. A girl may be content to compute how much it will cost her to make a waist with georgette at so much a yard and a fractional number of yards required, but the boys in the same class will not enthuse. On the other hand, boys will be glad to figure how many gallons of "gas" will be required to go from New York to San Francisco in a car of some make that travels on the average  $12\frac{9}{16}$  miles per gallon. The girls may show some signs of interest in this problem, but not enough to work very hard at it, because they never expect to pay for the gasoline themselves.

However, it is possible to make the problems given to all the pupils commercially sensible. Some problems are, on the face of them, impractical. For example, no one today buys a house lot that is 6 rods, 2 yards, 1 foot and 2 inches wide, as one would suspect from the arithmetics. Nor does he buy very much coal by the long hundredweight today. In fact, it is seldom that the expression *hundredweight* appears at all in commercial reckoning. There is more likelihood that the ton of 40 cubic feet will be used, and that is seldom mentioned in school books.

It is possible that, so far as arithmetic is concerned, the solution of the difficulty may lie in the use of a textbook, different chapters of which relate to different callings, from which the pupils may make a reasonable selection, a boy perhaps taking the problems under the head of carpentry while his sister is struggling with the chapter on millinery or groceries. Such a plan of course puts a considerable strain on the teacher, who must be prepared to answer questions of a highly technical nature which are suggested to the pupil by his parents.

For example, a molder's son may very likely come into class any morning and want to know whether he is to figure the weight of a flask full of sand dry or wet-up, and a pattern-maker's little boy may want to know whether, when he is figuring the weight of a deep fin on a casting, he shall take its thickness at the bottom or at the top, or half way up. If the teacher can answer, his stock goes high in those households; if he cannot, it is simply the expected.

**35. English.**—In the public schools the subject of English means much grammar, which is universally disliked by the boys and only tolerated by the girls, and the reading of some literature, which through many years of use has become immune to criticism. When there is such a crying need for vocational guidance, it would seem as though some really good description of different trades and professions, written by some one who really knows, and presented in concise and easily-understood terms, would make a most excellent substitute for ancient authors whose principal claim for recognition in school is that none of the children are mature enough to understand them. It seems also as though just a few of the most elementary principles of elocution might well be taught. As it is now, pupils do not know, except by accident, how to sound their letters correctly nor how to enunciate in such a way as to make themselves clearly understood.

**36.** Letter writing is likewise badly neglected; not that a sufficient number of letter-writing problems are not given to the pupils, but because the letters are not carefully criticised from a business standpoint. There is undoubtedly a great deal of very bad letter writing, but there are textbooks that deal with letter writing in a modern way, which are at least within the comprehension of the teachers.

**37.** The study of formal grammar can hardly be criticised on any ground, except that it appears to have done little good in the last century. There is much question whether pupils in the grammar grades can be expected to understand the principles of English grammar. The subject is difficult for high-school pupils to comprehend, and there is ground for suspicion that a great many college students do not fully understand it. The greater number of people who use passably good grammar can cite no rule for it; they do it because they have acquired the habit from much reading, so that anything which is radically wrong is discovered by sight or sound.

**38.** The spelling of the students is usually bad, whether at the conclusion of the graded school, in high school, or in

college. Just when people do learn to spell is an open question. Sometimes it appears to be only when they see the words spread before them in typewriting or print, and then only from the habit of seeing the words spelled correctly in the daily papers. It is very likely that when the old-fashioned spelling bee was popular there was much better spelling than there is now, for now there is no very popular interest in correct spelling and nothing to arouse it. The only hope in this direction appears to be in the revival of the spelling contest as a game in the grammar schools and in the Americanization classes.

**39. Writing.**—Handwriting appears in danger of becoming a lost art, as the result of the constant use of the typewriter in business correspondence, and portable machines for ordinary letter writing. It should be noted, however, that the sale of fountain pens has risen in about the same ratio as that of typewriters. Unless all these pens are being bought for the purpose of attaching signatures only, there is still a chance that handwriting may be worth teaching. The schools appear to have mostly recovered from the craze for vertical writing that nearly ruined the handwriting of so many young people, with its childish look, and had neither the merit of being easy of execution nor of being legible. From a business point of view, any handwriting is good that is legible; differences in the proportions of letters and different slants can all be forgiven if there is no doubt as to what the letters are. Study of thousands of hand-written letters shows that the legibility of handwriting does not increase in proportion to the maturity of the man nor with his length of time in school. The maximum clearness appears in students who have gone through about six grades, from which time on it falls off and is at its worst in college graduates. This, however, should not be laid wholly at the door of education, for it also appears that the worst handwriting appears to be that of the quickest thinkers.

**40. Relative Importance of Different Subjects.**  
In the answers to the questionnaire previously mentioned, the

members of the National Association of Corporation Schools indicated that they regarded a knowledge of geography as next in importance to the three R's. It is true that national lines sometimes change rapidly, so that at times it has been difficult to keep up with them in the public schools; but physical geography undergoes little change, and a source of raw materials, even though closed to commerce for a time, does not cease to be a source; for lines of trade in the same way must again be opened. Where to go for raw materials and how to get them to the manufacturer are the matters of importance.

The general opinion of those answering the questionnaire appeared to be that the public schools should lay special stress on the instruction in reading, spelling, English, writing, arithmetic, and geography. The other subjects, such as history, freehand drawing, music, botany, etc., were regarded as less important. This, however, does not mean that any employer would condemn the study of those subjects; but the purpose of the inquiry was to discover what was essential from the business point of view. These other subjects are more for self-satisfaction. History is of value as furnishing a knowledge of what has happened from which each may make his own deduction as to what may happen again. Freehand drawing helps one to appreciate the better work done by professionals; botany, if taught for that purpose, teaches appreciation of nature, and so on.

**41. Public Manual-Training Schools.**—One of the answers to employers' criticism of the alleged inefficiency of the public schools is the manual-training school. It has not accomplished much, except in those places where it has fallen into the hands of men who had trade leanings. Where it has been controlled by professional educators, it has been made subservient to their general idea of education. The worst faults generally found in such schools are lack of thoroughness and lack of practicability. The first is due to the opinion held by many educators that once a pupil can do the thing that is being taught there is no further educational value in



it. That is, they propose not to allow practice to perfect the student in the application of the theory that is taught, but only to allow it as an illustration of that theory. While manual training uses trade names, and to some extent trade equipment, it is apt to abhor trade methods. Where the trade method is to make a bolt by upsetting a head on a bar and turning the body on a turret lathe, and to make a milled screw by turning it on a turret lathe from stock the size of the head, the manual training school is likely to center both and turn them on an engine lathe. At the best, equipment is provided sufficient to allow only a very few hours a week of manual training, and that is divided between woodworking, cabinetmaking, patternmaking, forge work, and machine work. The schools in a great many cities of considerable size have not progressed so far as machine work. From all this, it will appear that manual-training schools are not equipped or intended to be helpful to employers who wish to recruit trained mechanics. Indeed, it is difficult to see that boys are any better apprentices in shops or any better students of engineering, because of manual-training experience.

**42. Public Trade Schools.**—Another form of response to the demands of industry are the trade schools. Some of them are showing ability to turn out graduates for whom there is a place in industry. Some are merely manual-training schools with another name. There appears to be no way that an employment manager can tell for a certainty whether to give any value to a diploma from one of them without personal knowledge of the school. If a trade school has sufficient equipment so that the pupils get at least 20 hours each week of shop work on real product in whatever trade they are taking up, and if the work turned out is salable, then it is likely that the graduates will make something of themselves, with a little experience under completely commercial conditions. They cannot do this, however, unless the instructors are men of practical knowledge. Usually such men need to be taught to teach, as it is not natural for them to analyze and transmit their thoughts. Moreover, there must be a

good balance between the men who teach shop work and those who teach the academic subjects. The latter must be men with a broad tolerance of the shop, and who recognize that the teachers of shop work have a necessary place in the school; the shop men must have an equal tolerance of the academic teachers, which they are not likely to have unless the latter demonstrate that their knowledge is of use in the trade. For example, it is difficult to get a shop man to see the value of algebra, simply because it is almost impossible to find problems in the machine shop which require the use of algebra for their solution. For that reason many trade schools omit all mention of algebra, only giving some instruction in regard to substitution in formulas and a few of the things that really do come under the head of algebra, but do not deal directly with the solution of equations. It is not easy to get such a combination of instructors, so it is nothing surprising if the trade school does not measure up to its fullest possibilities; but, given the right faculty, and adequate equipment, the graduates should be the very best material for employment in whatever trade they may have studied in school. They have one very decided advantage over boys who have picked up a trade or served an apprenticeship, in that they have had enough academic work so that they can think their way through the jobs which come to them and do not have to depend entirely on remembering how they were told to do some rather rare job in the past.

**43. Part-Time Schools.**—A combination of academic work given in the public schools or colleges and actual shop practice in commercial shops is furnished in part-time schools. The usual plan is to have the students spend alternate weeks in school and in shop; sometimes the interval is two weeks. This plan is used for both trade-school and engineering-school work. Theoretically, it is as nearly perfect as any one could wish; practically, there are the same objections to it that occur in a full-time trade school if the faculty is chosen in the same way as are the instructors in the full-day trade school.

The part-time school places the boys in the shops under the foremen of different departments in succession. Very few foremen are teachers. Moreover, they have the duty of getting out work, of making a record in production. Teaching the boys who are assigned to them is a side issue, something that most of them do not care to do, but which they take on in a perfunctory way because they are told to do it. There is very seldom any means for teaching the foremen how to teach and they would probably resent having any one try it.

The teachers in the schools are likewise selected for their academic accomplishments, rather than for their knowledge of the trades for which their pupils are being trained. There is no great opportunity for them to get acquainted with the foremen in the shops, for the foremen, being shop men, are not available for conferences and meetings as they would be in a school. There is not the opportunity for an organized course of instruction in shop work that there is in a school, as the work is necessarily a part of the shop's production and must be made up when there is a sale for it. Moreover, a trade school can secure a very much larger range of work for its pupils than even a very large shop can offer.

When this part-time plan is applied to engineering work, the conditions are somewhat different. The pupils are more mature and have a better idea of what they are attending school for. They insist on getting instruction from the foremen with whom they are placed. In fact, it is part of their training to be able to secure information. In engineering work, the college professors have more time to follow up the work their pupils do in the shop and to show its relation to their studies. The professors are, however, at a disadvantage, in that it is impossible for all the students at the same time to have work that illustrates the lectures that are being delivered at the college. For example, suppose that a shop manufacturing textile machinery takes a dozen half-time students in mechanical engineering. One man may be assigned to the power plant, two to the erecting floor, three to the drafting room, and so on. In their progress, these students will work

in the different places at different times, so that the only time when the twelve will have the same amount of experience will be when the courses are completed. When the professor must deal with such conditions, about all that he can do is to strike an average, arrange a course of lectures, and stick to it, and make them as clear as possible without the practical illustrations that would be furnished in the shops of an engineering school having its own shops.

If the employment manager finds himself in a shop that is cooperating with some school, either as a part of trade training or as a part of a college plan, he can be of immense value by making the routing of students through the shops correspond as nearly as possible with something that the instructor in charge of academic work can follow in the class room and lecture hall. This, however, is not easy to do. For example, it is usually impractical to arrange for all the students to have their practice in the boiler and engine room at the time when the subject of thermodynamics is being studied.

**44. Continuation Schools.**—Because a great many boys leave school as soon as the local laws permit them to be accepted in a shop, several states provide by law for continuation schools for working men and boys. In these schools at various times through the week, classes are held to which boys who are working are sent to pick up their general education at the same time they are earning a living. Some of these classes are held early in the morning before boys who work in offices have to report, others are held at night after work, some on Saturday afternoon, and many others during working hours; for in some states the law requires the employers to allow the boys a certain number of hours weekly to attend these schools without deduction from their pay. Such work is not industrial education, but is strictly general education that these boys would be unable to get otherwise, owing to the fact that they are working.

Unfortunately, few of the boys who are affected by these laws have any personal interest in this educational work. Most of them left school to go to work, to be sure, but it was

because they thought that the shop was the lesser of two evils. When they are allowed to go to school during shop hours, they look on it as a lark and absorb very little information unless they fall into the hands of an instructor who makes the lessons very interesting, not to say entertaining.

In some instances this work has been much improved by giving the boys work drawn largely from the trades at which they are working. This makes concrete problems possible, which in itself is a great advantage, both in its educational effect and in its drawing power; for here, as much as in any other educational effort, the old saying about leading a horse to water but not being able to make him drink holds true. If classes are made voluntary, a few boys will attend so long as they can see, with their limited vision, that they are getting something; when attendance at the classes is made compulsory the lessons are either treated as a joke or are gone through in a sullen half-hearted way.

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#### CORPORATION SCHOOLS

**45. Varieties of Corporation Schools.**—The term *corporation schools* includes the various kinds of educational work carried on by corporations and other business individuals and firms. It includes what are practically continuation schools conducted by the firm, apprenticeship systems, trade schools within the works, but entirely separate from the production department, schools for salesmen and minor executives, and any other educational activities into which the firm may care to go. The schools for salesmen and executives will be discussed under another head, but the more strictly trade training is treated here.

The first efforts of a firm that foresees a shortage of skilled men are usually directed toward an apprenticeship system, regardless of the fact that real apprenticeship has been practically dead for years. To make this new apprenticeship attractive, and also because there is a realization that some rather technical knowledge is desirable even in a workman, classes are formed for instruction in what may be classed as

mechanical intelligence. Usually an attempt is made to hold these classes in the evening outside of working hours. This does not work; as the apprentices feel that they should be paid for the time spent, and if that is granted they soon want time and a half for this overtime. Then the class-room work is put into the regular working day.

The next development is brought about by the reluctance with which foremen take boys into their rooms in the regular course of business, knowing that at the discretion of the supervisor of apprentices the boys will be taken out and moved elsewhere soon. As a result of this difficulty, it is discovered that no more machinery will be tied up by having all the apprentices in one place than if they were scattered over the shop. Then some one foreman is discovered who is interested in boys and who has the patience and the teaching knack to handle them, and then it is found that the shop has a complete trade school of its own. This last stage is the most successful and the most lasting of all.

When the boys are scattered over the shop, there is need of some pretty close supervision of the shop work by some one man. Without such supervision, it will soon be found that the teachable boys are persuaded to leave the class and stay with one of the first foremen they meet, while the laggards are passed from place to place quickly, learning but little, until they are finally pushed out the door without having had a real chance to learn anything. This defeats the real purpose of the apprenticeship school, which is to train a group of boys into all-around men who can aspire to good positions with the company.

When the apprentice school becomes a complete trade school, it encounters all the problems of the public trade school, with the two exceptions that it can make a more favorable selection of pupils and it does not have to pay any attention to local politics. Both of these are very much in its favor, so much so that it would seem that in moderate-size communities business men could get together and run a joint trade school, and train their boys on a wholesale basis to considerable advantage. However, from the point of view

of the public, it seems no more than right that any boy who aspires to become a patternmaker or a machinist should have the same opportunity as does his brother who aspires to become a lawyer or an engineer. On this plea, each community should in fairness offer trade training; but, even if it does, there is nothing to prevent any manufacturer from starting his own school unless he feels that he ought to stand by the town and give it his support. If the community does not see fit to offer such training, there is no doubt that shops will have to, as the supply of skilled men is very likely to be cut off both by embargoes in foreign countries and immigration laws here.

**46. Organization of an Apprentice Trade School.** Equipment for an apprentice trade school is usually gathered from the shop. Foremen will, of course, try to get rid of the worst they have, as anything is supposed to be good enough for an apprentice, but the supervisor should see that he accepts nothing the design of which is much behind the average of the shop. Broken parts and worn parts need not affect him, as they offer the finest possible thing for boys to work on. He should look at every bit of equipment as something that is to be brought into perfect condition and kept there. His greatest trouble will be to get instructors. A good instructor is also usually a good foreman, though the reverse is not necessarily true. Because he is a good foreman, the production department wants to keep him, and they will generally do so until the management is sufficiently impressed with the necessity of supporting the school to insist on his transfer to it. A school that is simply a fad with some one in the management, and which he is allowed by the rest of the company to play with, is hardly likely to be very successful. It needs the full support and backing of the whole board of directors to make it a success.

Certain things should be conceded in advance of any training; one, that the first comers in the school, the apprentices, will not do so well in a given length of time as those who come later. This is not altogether because the school is new, but



because the example of the older boys is not there to encourage the younger. Another thing is that a great deal of time will be spent without apparent progress, just as in the spring the seed lies in the ground with no visible signs of life. Another thing is that boys will be boys. No school discipline is possible that is like that in a shop where there are 20 men to every boy. There will probably be no more mischief in the school than in the shop, but it will appear to be much worse because it will be in sight. Another point is that if real teaching is done there will be a larger percentage of spoiled work and slower production than if the boys are exploited and the greatest possible production made. One superintendent has aptly said that "A trade school is simply an inefficient shop," which would be very nearly true if he had not implied that that is all that constitutes a trade school.

The primary object of a trade school, whether public or in a shop, should be to teach boys to think straight, and especially to think straight about mechanical things. If a man can think in tenths of thousandths of an inch, he can make his hands work to that fraction; and, conversely, a man who can work so accurately is likely to think of other than mechanical things with the same accuracy. The greatest criticism made of our skilled mechanics and engineers is that they are so accustomed to working and speaking in terms of minute accuracy that it is almost impossible for them to tolerate the easy going rest of the world. However, a little accurate thinking is a good example for all the rest of the citizens of any community.

**47. Work to Be Done in a Shop School.**—The work that the apprentices are to do should nearly always be drawn from the work of the shop itself. If the school is for the training of machinists, as are more than half of all such schools, the work should be mostly on stock parts, such as may be made on a regular shop order, but which when completed will be put in the stock room to be drawn on from time to time as required. 'Very little work that must be completed at any given date should be undertaken by beginners. More-

over, there should be a large amount of work in process compared with the amount that is being completed. There is nothing that helps good instruction so much as to have a large number of jobs of different kinds from which to draw the next job for a boy. For example, a boy may be on his first job of threading on a lathe; if he takes hold of the job extremely well the instructor may next give him a job on which a small amount of other work has been done, though this will be lost if the boy spoils the thread. If, however, a boy on his first job of threading does not get on well, the instructor will probably find it safer to give him some bolts to thread that would naturally be cut on the bolt cutter. Similar conditions apply to work on a planer. A boy may have some parallel strips to plane; if he shows intelligence about getting them out of wind, the instructor will want to give him for the next job, possibly some flat plates with the edges to be squared. If, however, the boy does not do well with the strips, the instructor may want to give him as a job something that needs nothing but a roughing cut to be useful, but which may be smoothed up, if the boy shows ability to do it. Just so, through all the trades that can be handled in a trade school, a large number of jobs on hand enables each boy to progress so smoothly and readily that he will hardly know that he is being taught at all, but will think he does it all himself. These boys are not like college boys who are impressed with a professor who lectures away over their heads and impresses them with his superior knowledge.

In general, the work of the individual boy may begin on any machine that is in common use, even on a grinding machine. The idea that all boys should begin on an upright drill, and progress through lathe work to milling and then to planing, has been proved to be without foundation. Each of these machines has functions in common with all the others, and other functions that are entirely different. The assumption that planer work is the hardest to teach is not borne out by experience. Some adaptability is required to do planer work in a shop where there are no special holders for the work, but the same is true of face-plate work on the lathe, and

milling work that has no fixture designed for it. The chief difficulty in planer work lies in the fact that in a shop a job that can be done on a planer is commonly considered to be a planer job until it has been standardized and fixtures have been made for it; then, often, the work can be done by a less skilled man on a miller.

48. At the very beginning, it appears best for the instructor to set up the machines and start the boys on the work, so that all they really do is to start and stop the machine. If there is an automatic stop to the feed, it should be discarded just as soon as the boys have become familiar enough with it so that they are not afraid of the work and will not get disconcerted and do the opposite to what they intend.

If the boys are to learn to think, however, it will not do for the instructor to do their work for them beyond this time while they are learning the ways of the shop and getting over their fear of machinery. If the instructor carries them too long, they easily become conceited and think they have done the whole job themselves; but if they have really to do it themselves, they will acquire a respect for the skill of men who can do the things easily that give them serious difficulty. There should always be a few jobs on hand for the reduction of swelled heads. They should not be trick jobs, like the foundry job of molding a cup and saucer with a spoon in the cup, but real standard shop jobs that have been done in the course of regular manufacture. It may be that jigs are used with such jobs now, but if it is known that the jobs were once regular jobs without fixtures, they are fair tests.

49. It will soon be found by the instructor who analyzes his jobs that the real difficulty for his students lies almost always in the making of measurements. In this respect almost all trades, with the possible exception of the printers and paperhangers, are alike. If a boy can measure with certainty to a quarter-thousandth of an inch, he can usually work at least as close. Therefore time is well spent in discovering how well a boy can measure and in teaching him to

do it correctly, even if it requires the spending of considerable time in non-productive practice. When a boy once gets so that he can take a micrometer, bring the screw up to the anvil once, feel how hard he turns it to come to the zero line, and then can measure a piece of work with certainty that he exerts the same pressure, he can go on with the same certainty, unless something happens that seriously disturbs his confidence. For this reason, an ill-natured scolding is quite likely to do more harm than good. Self-confidence without overconceit is what is needed. Some foremen say that they only want men who have had all the conceit knocked out of them; but when they get that kind of men they are quite likely to find that all the production has been knocked out too. It is hard for a man who is in constant fear that his micrometer is not set right to get out any reasonable quantity of work; he is always fiddling over the instrument and constantly running it up to zero to get the feel over again, when he should be turning out work.

50. After there are boys in the school that have been there two or three years, and the younger boys see what they are accomplishing, it is easy to get the new boys to go ahead rapidly. In the early stages of the school, they only see the work done by journeymen, and they do not deem it possible that they will ever get to be able to do it, in which idea they are, more often than not, encouraged by these same journeymen; whereas boys do get to be very expert, especially in the absence of the older men who are constantly reminding them of the dangers of overwork. Experience with trade-school boys shows that there is more danger that they will have to slow down from their school pace to meet that of the shops than that they will have to speed up. This is true if the work is done on a day basis or on the basis of piece work with a limited production, which amounts to the same thing. Trade-school graduates, however, find it comparatively easy to rise to the emergency when they find a piece-work system where rates are not cut, or where there is a bonus system that puts a premium instead of a penalty on high production; because,

understanding fundamental principles, they find easy ways to accomplish difficult things.

**51. Academic Work.**—Many competent shop managers are struck with horror at the word academic, but it is just as well to call things by their true names. The boys in the trade school need to be able to read readily, to write legibly, and, without serious effort, to use arithmetic through square root, to know the fundamental principles of geometry, and to be able to handle enough trigonometry so that a table of the natural functions of angles is a useful tool. They can hardly find a use for algebra, unless learning to substitute known quantities in formulas and to solve the arithmetical problems thereby set up is considered to be algebra.

It is possible to have the boys read trade papers, write shop reports, and do shop arithmetic, and thus cover the academic and cultural side of the instruction; but these are exactly the same thing, except that in the shop trade school all the illustrations are drawn from the particular shop in which the boy is working instead of being drawn from a wide range of similar shops.

It is very difficult to secure suitable textbooks for shop schools, but it is also very expensive to write textbooks for every shop. Each instructor will have his own ideas of how all the subjects should be presented and each will probably wish to write his own books, from all of which sometime one may be evolved that will be satisfactory to many. At present, the trouble with the adoption of any one book is largely due to differences in nomenclature and in the different methods of doing jobs in different shops. In a way, these differences would have a broadening influence on the boys; but if it would tend to destroy their faith in the methods used by their own shop it is better that the books should not be used. There is a great difference in shop superintendence about these things. Some want only those men who are totally subservient to the ways of their shop; a man who even inquires if the superintendent knows how a certain job is done elsewhere is an object of suspicion, as if he wished to break up

the morale of the place. Others only want men who will fight for their own ideas, men who are always trying to find new ways and who will defend their ways strongly enough so the best way may be arrived at. Under the first-mentioned superintendent the boys must be taught to do things exactly according to the superintendent's method, and no breath of suggestion must be offered that any one else has any other way to do it. Under the other kind of superintendent, it is wise to furnish the boys with all the collateral reading possible and incite them to discussion and argument as to the best way to do various jobs. There is no question which of the two ways is most likely to give the shop the strongest organization years after the first superintendent has passed away; but the first way, in which one dominating man has his own way in everything, usually produces the most profit for the moment, and certainly keeps the overhead charges low.

**52.** In addition to the subjects that come under the head of academic, there are two, physics and shop intelligence, that are needed in almost every trade. Physics, for the machinist trade, should lay stress on mechanics; for some other trades, on chemistry, as in the manufacture of paints, dyes, etc.; on sound, for the manufacture of pianos and organs; on light, for the manufacture of lighting apparatus; on heat, for manufacturers of stokers, engines, pumps, and so on. Here again the usual textbook on physics is not exactly what is required, if for no other reason, because it is usually written with reference to the metric and centigrade system of units, while in almost every case the results of study of the book must be used in terms of English units. Moreover, the problems usually given are so abstract and so lacking in application to the practical problems met in the shop, that it seems almost necessary for each school to prepare its own books, though an exception may occur in the machinist business for which so much work has been done that some done in one shop may be applicable to others.

**53.** The greatest difficulty usually experienced in shop trade-school work is to get an adequate amount of time for

the academic work. If one-sixth of the week is given to it and half of that is available after the necessary drawing is taught, the instructor is fortunate; whereas, in the public trade schools the pressure is in the opposite direction, and the time for academic work is likely to be even more than half the total. However, in such instances the time spent on these subjects is by no means wasted, if the work is given a real shop flavor; for the boys who have a clear understanding of mathematics, and especially of physics, will surely, as shown by experience, outstrip the boys who have learned *how* to do things without also learning *why*.

This matter of the amount of instruction that is to be given in the academic subjects should certainly be considered and decided by the highest power that it is possible to reach in the organization, for its bearing on the future of the establishment is of the greatest importance. If the organization is of the one-man type, then it is probable that very little time will be allowed for "book learning," and the instructor will probably have to give that little while the boys are leaning over a drawing board or by cajoling them into studying at home. If the shop runs more to organization and democracy, then there is much more likelihood that the appeal for teaching the boys *why* will be successful.

If time cannot be obtained for teaching physics, it may possibly be obtained for the teaching of shop, or mechanical, intelligence. This can be launched by getting some of the old-timers in the management and among the foremen to give talks on some of the mechanical mistakes they have seen, which may range from the story about the man who laced a belt through the rounds of a ladder to the men who have invented very plausible perpetual-motion machines. Such talks will lead naturally to instruction in mechanical principles sufficient to prevent the making of similar errors, and this instruction may be extended to a full course in mechanics, from that to a well-proportioned course in elementary physics, and from that to mathematics, and so on.



## TRAINING OF FOREMEN

**54. Purpose and Methods.**—The training of foremen may be of two main types, the first where young men who show evidences of executive ability are trained so as to fit them to handle the work in some department; the other, in which men who are already foremen are trained in the newer ways of handling help, and in their relations to the organization. This latter kind of training is perhaps more necessary with the change from a strictly line organization to staff and line or to a functionalized organization.

For the first-mentioned kind of training, the men selected to be trained are assigned successively to each of several departments, the work of which has a close relation to the department in which it is hoped that the man may become a foreman. In each of these he stays long enough to do all the important kinds of work well enough so that he can appreciate the difficulties and troubles that naturally arise, and also so that he can see just what he can rightfully expect from the departments that precede his in the manufacturing process, and what he should be able to deliver to those that follow. If the work involves mathematics, mechanics, etc., he should also be instructed in such of these things as are necessary to supplement his past education, or to refresh his memory. The latter is the more tactful way in which to present the subject to a foreman, and it is true that it is nearly as much of an effort to straighten out the men who have had a good education and not used it as it is to teach the subjects completely to others who have not had any part of a technical education.

**55.** The large problem with both classes of trainees is to teach them the new order of things in their relations to the firm and to the men under them. This new order has its largest apparent difference from the old in the matter of discharging or dropping of men. Under the old order, which prevailed at almost all times from the first years after the Civil War up to the opening of the World War, men who

wanted jobs were so plentiful that the foreman could discharge a few at any time, for the sake of the example on the rest of the men or for the sake of displaying his authority, with the full knowledge that he could have the choice from a large number of others to fill the vacancies which they left. At that time, no one had taken the cost of training new men seriously, and the losses from such random and arbitrary action were not apparent. Later it became well understood that unnecessary loss of men might cost up even into the hundreds of dollars each, and that it surely, in the case of semiskilled men, ran up to at least \$50 each. Such losses, multiplied by the number of men lost, made tremendous amounts, which became even more startling as labor turnover from voluntary leavings alone ran up to several hundred per cent. during the World War.

The purpose for which the training classes for foremen are largely maintained is to help each foreman to find a way to maintain discipline and secure production without resorting to the discharge or firing method. This requires a full, frank, and free discussion of all the things that have been discussed in this and preceding Sections in relation to the reasons why men leave the shop. The foremen should have each week's report of men leaving classified by departments and also classified by the reason why each man left. They should compute, as nearly as they can agree, what it will cost to replace the men that have left each department in a given week, and consider just what steps might have been taken to avoid the loss, what is the best method of replacing these men, and so forth. Of course, if the work is done by skilled workmen, and there is a plentiful supply, so that better men can be obtained than those who have left, the cost of making the change becomes negative, and the foreman who is farsighted enough to fill up his department with men who will make a good nucleus around which to build a large organization when business becomes better should be commended.

**56.** The first thing that a foreman has to do after he has accepted a man sent him by the employment department is

to find out just what the man can do, both as to quantity and quality. That is, a foreman who puts a man on an easy job and forgets him and leaves him there when he might be doing some very much better work, is throwing away money for the company. Some men will not allow themselves to be hid away like this, but will insist on getting as good work as they can do, or sometimes better than they can do successfully. The foreman's instruction should bear on this point, so as to make plain that the firm cannot afford to have any work done by a man who can do better work, unless in an emergency.

**57.** Another thing that may well be presented to a class of foremen is the quality of patience with learners. When a man is hired with the understanding that he is a learner, full opportunity should be given to him to learn. If he is quick, the foreman should watch him closely to see that he is thorough, but if he is slow he should be brought along without being too much hurried. There are many cases of men who have been slow to learn but who have later on developed to fill positions of considerable importance. They have usually done it by being buffeted from shop to shop, but in each shop they have picked up a little, and by putting these many littles together they have ultimately outstripped the brighter men. It is the old story of the hare and the tortoise, and it is repeated day after day. If the management of any shop that has been in existence for 20 or 30 years look back over their records and list the men who have worked for them and whom they wish were still with them, they will almost certainly discover that they have lost enough men who have since made good to have given them an organization that would be far better than the one they have. If such a record can be spread before the foremen it will be an object lesson that will do more good than all the lectures that the general manager can deliver to them.

**58.** The characteristics of the men of different races who work in the plant should also be discussed. We cannot expect to be able to change quickly characteristics that have

been centuries in the forming. Some of these characteristics are extremely difficult to understand. Often it seems as though the men who have them could never become American citizens in the real sense; and yet we know that unless we assimilate these people they will assimilate us. Each foreman should be fully impressed with the importance of his work with foreigners as affecting the future of the country, and he should be made to understand that, even though he cannot do a great deal, if every foreman does not do the little that he is called on to do there may be serious results for all of us.

As will be explained in another Section, under the head of Americanization, there is much that should be done by some organization other than the shop, but since the workmen spend so much of their wakeful time in the shops, there is a greater opportunity there for helping them to take up our ways than can be had by an outside organization that can only see them an hour or two a week.

**59.** Besides being in charge of the time of the workmen, foremen are also the custodians of very valuable company property. Formerly, it was possible to recruit a force of workmen who respected property rights much more than they do today, and who realized their responsibility as to materials, tools, and machines much more fully than they do now. The war with its tremendous waste only served to make this condition worse than it was. The soldiers who knew about the "million-dollar barrage" in which shells to that value were hurled on a small part of the enemy's line in a few hours, and who saw large quantities of valuable material destroyed without apparent reason, can hardly see any value in a machine that costs only a few thousands. It is part of the foreman's job to make the workmen see values in terms of their own incomes, rather than in terms of million-dollar wastes. Moreover, in impressing this on the workmen the foremen will learn to apply the same idea to their own work, for many of them have acquired a disregard of small things, in common with the rest of the American people.

60. One of the most important jobs of being a foreman is that of a teacher or instructor. In a few favored shops, the management will install a school for the training of certain apprentices in skilled work; sometimes there may be a vestibule school, or trade school teaching certain workmen each a single operation. In spite of all these efforts, the very great majority of all workmen still go direct from the employment office to the foreman, and they succeed or fail according as the foreman has a natural gift for teaching or not.

In a great many instances foremen have discharged men for not knowing how to do a job, when the fault was the foreman's because he had not told the man how in an intelligent manner. Foreigners will almost always say "Yes, yes" to any instructions; not meaning that they understand, but as showing approval of the foreman and a desire to please him. Then they watch some one else and do what the other person does as nearly as they see it. It is not enough to tell a man how. He must be watched until it is seen that he has grasped the idea. He may have the very best of intentions, he may think he understands, but, like the foreigner in the picker room, he may put his hand in the way of knives revolving so fast that he can only see them as a haze.

The first principle of all teaching is to analyze into its elements the thing to be taught; and it is just there that the first attempts at teaching often fail. Very few practical men analyze their own jobs. They have done the work so long that it is second nature for them to do it correctly. They do not realize half what they are doing while they are doing it. They are like jumpers or golf players, who cannot tell what motions they make until they see them revealed by a slowly shown moving picture, and then they can hardly believe what they see. Therefore, there is need of analysis of the job down to its minutest elements. This analysis often shows the man who is accustomed to doing the work how to do it in a better way, and that is a valuable thing for him to discover.

Then, there is the necessity of stating simply and correctly what is to be done. The instructor who fails for words and tells a workman to "take that d—d thing and move it up

about a foot and then tighten up those do-dads on the back," may have a very definite idea of what he wants done, but he does not convey it. Fun is sometimes made of the precise method of speech of the school teacher, but we have to admit that it is the result of necessity; for if she were to teach in the slack terms that are used every day in the shops, her pupils would be subject to more criticism than they are now. This exactness of instruction can readily be obtained as soon as the instructor knows definitely, by analysis of the job, just what he is trying to teach.

The next thing in order is the showing by example or sketches or whatever method is desirable and appropriate. This is very necessary, especially to those of low mentality. Well-educated people, and some especially gifted men without much education, visualize things well from oral descriptions, but the great number do not. The easiest way to visualize anything is to see it, and fortunately this is possible in most manufacturing processes. Seeing is not enough, however, unless it is supplemented by the reason why; and giving of reasons is another of the things that are not well done by the average foreman. One cause may be that he does not know the reason. Another may be that he does not feel that it is necessary for him to tell it. He may feel that he is an authority and that no one needs to know why, but that each should do as he is told. All of which is true in a sense, but the idea does not result in good teaching.





# PERSONNEL RELATIONS

(PART 3)

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## MISCELLANEOUS FACTORS IN PRODUCTION

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### SAFETY ENGINEERING

**1. The Safety Department.**—The department having to do with safety is usually related to or a part of the employee-relations, or service, department. It, however, has to deal very directly with the production department, and also with the company that carries the insurance, unless the shop carries its own insurance, which is permitted in some states. The safety department is customarily looked on, not as an aid to production, but as a hindrance to it. The members of the department may be tolerated for their good-fellowship, but not often for their work. Although entirely natural, this is an altogether wrong attitude for the production department to take. A good and active safety department introduced in almost any plant will find things that should be done that will, for the time being, make production more difficult or at least slower. In the long run, however, it will aid production, because a safe shop attracts the best class of help, and this good class can and will turn out enough more work to offset entirely the little slowing down that may result from the activities of the safety department.

**2. Haste and Accidents.**—Daily experience shows that most accidents come from too great haste. We do not look to see whether an engine is coming, or if we see it coming

we take a chance and speed in front of it, and possibly get hurt. It is characteristic of Americans, whether born here or newly adopted, to take these chances merely to save a few minutes of time. Often the demand of the shops for punctuality is a cause of chances being taken by employees.

The most effective way to prevent accidents is to remove the chances for them to occur. The removal of incentives for haste and carelessness will do little good, for the habit of carelessness is too strongly ingrained in many workmen. Therefore, instead of depending solely on the success of efforts to teach workmen to be more careful, these efforts should be supplemented by safeguards against injury even in moments of thoughtlessness. Unfortunately, these safeguards may hinder production to some extent. Occasional adjustments must be made and the guard may be an obstacle; guard-rails may close the short passage through a dangerous section, thus requiring more time to go around. However, the demand for safe working conditions is constantly growing and not likely to be stopped.

**3. The Safety Engineer.**—As a result of the growing appreciation of the importance of safety, a safety engineer has a much greater hope of accomplishing results than he had even only a few years ago; but he cannot hope to accomplish much unless he is really an engineer and can so plan his safeguards that they interfere as little as possible with production. It is sometimes asked, why, with all the state inspections and inspections by the employer's liability insurance carrier, there is need of a safety department for a shop. The need, theoretically, should not be there; but the inspections by the State are usually only to discover whether the technicalities of the law are observed. The inspectors are not usually men of any great insight into the business they inspect; consequently, they make many recommendations that need to be reviewed and possibly reversed. No one is in a better position to do this than the plant safety man. Then, the fact that the State inspector is allowed to report only on things covered by the law makes his work particularly ineffective, because these

laws are necessarily general and may not apply well to the conditions of the particular shop. There are then a great many things affecting safety in each shop that should be taken care of, that the law does not permit the State inspector to take into consideration.

The insurance inspector likewise sees things from his side altogether. Almost every report made by an insurance inspector has suggestions that are really unreasonable in view of the surrounding circumstances. He asks for the impossible. Full compliance with his suggestions would seriously cut down production. He, too, is not a universal engineer and he cannot be expected to see all these things from the shop's point of view. The safety engineer is the man to take into consideration all the facts and recommendations and to agree upon measures that will produce the required results, but which will not cost a prohibitive amount either figured in first cost or in lessened production.

The safety man also has a great opportunity to assist and back up the employment department in producing good feeling among the employes. There is no time when a little human sympathy, rightly directed, goes further than when a man has been injured and is getting ready to get back into the shop. The man who holds out a practical helping hand to him then is likely to be his friend forever. If the safety engineer can arrange to make the payments for compensation directly to the man, having first cashed the insurance company's check or even having the firm advance the money so that the payments may be more prompt, he can make up for a great deal of the loss in production due to the accident, through the improved morale which is spread by the injured man. Most workmen are very "good sports," in that they accept accidents as a part of their vocation; but they think very highly of the man or the department that makes a visible attempt to make accidents less likely to happen or that takes care of the victim after an accident has occurred.

**4. Work of the Safety Department.**—The work of the safety department may be classified in three parts: (1) The

guards to prevent the possibility of accidents; (2) safe practices in production; and (3) the care of men who are the victims of such accidents as do occur.

Guards may be placed in accordance with good engineering and established safety practice on the advice of an expert, or they may be installed as a result of experience, on the same principle as the farmer who locks his barn door after the horse is stolen. Safe practices in production do not very often seem to come except as the results of accidents. If a tabulation of all the accidents that have cost the company anything in lost time or hospital care, or that have made payments by the insurance carrier necessary, is presented to the management at the end of each year, it may be possible to so analyze them that the management will see the profit in dollars and cents of discovering safe methods of doing work. For example, men wheeling barrows of heavy material up an incline may rush across a passageway at the foot of the incline so as to endanger the safety of persons passing. It is for the management to say how this danger shall be avoided, but whatever the decision as to the right of way, the passage should be so guarded that nothing is left to chance. If an absent-minded official of the company should come along and get even very slightly injured, there would immediately be safe practices installed.

## HOUSING AS RELATED TO PRODUCTION

**5. Kinds of Houses.**—Nearly all housing plans in connection with factories have been evolved as matters of necessity. There is a great difference, in methods as well as motives, between the operations of a contractor opening up a real estate development and a company furnishing housing for its employes. The contractor is looking for an immediate profit; the company's housing operation is usually regarded as an expense that may or may not result eventually in a profit.

The builder for profit leaves a great deal for the purchaser to hope for and ultimately to do for himself. He will try to sell his houses before they are papered or the electric light

fixtures are in, on the ground that the purchaser will prefer to select such things to his own taste. The lawn will often be left to be graded and seeded. Shrubbery and trees also are omitted. The sidewalk in front of the house may be left undone, though front and back walks are usually put in, to avoid muddying up the house when showing it to customers.

The manufacturer who builds a model village does not use all these tricks. He builds what he calls an honest house, which is not very much better than the house built to sell, but he completes it. He has a natural pride in the completeness of the village, he knows that he will have visitors from all over the country to see it, and he wants to make a good appearance.

The opposite extreme is reached in mill towns away from regular lines of travel and to which customers of the plant never come, even if they know where it is. In these towns, the houses are seldom sold to the employees, and for that matter would not likely be bought by them if they were offered. They are built with four or more tenements to a building, and each tenement has a very small back yard, hardly large enough for a garden, and a tiny front yard not quite large enough to justify ownership of a lawn mower. The result is that these little lawns are not cared for, and the village soon assumes a run-down appearance. Between these two extremes, there lies a sensible and feasible housing plan, one which takes into consideration the fact that a house is primarily for the comfort of the occupants, and that it does not have to be ugly to be economical.

**6.** The first requirement for determining the kind of houses that should be built is a study of the people to be accommodated and the kind of places which they already occupy. Almost every shop in the country that is outside the principal centers of population has gradations of employees, ranging from laborers whose families have been here so short a time that any habitation that has not been condemned by the board of health appears a palace, to the office people who will delight in the toy-like villages that appeal to a landscape architect. The

larger number, however, will want a house that can be rented by the month for a little less than their weekly income, and one that will have rooms enough for a family of some size and in which the rooms are not too small. The more skilled the employes are, the greater is the likelihood that they will want single or detached houses. A complete housing plan will comprise a little village a short distance away from the other houses and out of direct sight of the shops, then a settlement of houses ranging from single houses to groups of six or eight in a block, together with a semi-public house in which single men may rent individual rooms. Possibly such a house may be needed for single women also. For the benefit of the morale of the shops, bunk houses should be avoided. These places, where sometimes a hundred or more men congregate, are sources of danger; one disgruntled man can produce a great deal of dissatisfaction. When men scatter to their homes after leaving their work, they find new troubles and comforts, so that they are likely to forget some of the things that have happened through the day but which the men in the bunk house enlarge upon.

The size of houses to be offered depends on the size of the families to be housed. In many ways it is well to encourage a family in taking a house with one or two rooms more than they need at the time, not merely to provide for possible increases in the family, but so that the family earnings may be increased by taking one or more roomers. This also helps to avoid the bunk-house problem. Generally the smallest single house advisable is one with a living room and kitchen and possibly a dining room on the ground floor and four chambers on the second floor. This will accommodate a family of father and mother and four children, and possibly a roomer. If the family is smaller than five, there may be two rooms to rent.

7. So far as the outside of the houses is concerned, the company should see that they are kept painted neatly, and that the fences, if there are any, are kept repaired. Among the office people and the highest grades of shop workers, small

prizes for the best-kept lawns will bring large results. Among the class that prefers houses all in one block, it will likely pay very well for the company to take care of the lawns and see that they look well so as to furnish an example to others. However, it is not to be expected that people who have never lived in clean houses with clean and attractive surroundings will change their habits at once; if they are not accustomed to these attractive surroundings they probably will not want them and certainly will not voluntarily do any work toward getting them.

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### GARDENS

**8. Advantages of Gardens.**—For many years, some companies have furnished land for gardens, which the employes have worked, not altogether for profit, but because every shop has some men who enjoy working the soil just as other men enjoy playing golf. From a strictly economic point of view, it is doubtful whether small amateur gardens cultivated by men who work 8 or 10 hours per day in the shop are profitable. Occasionally a man who ought to be a market gardener, but who prefers to work in a shop, will show remarkable results; but for the most part the amateur gardeners would make a great deal more money if they could secure the opportunity to work overtime, even without the bonus, than they can make in the same number of hours in a garden. There is, however, something very restful about hard work which employs another set of muscles; there is also something very pleasurable about working in the soil, and then there is the satisfaction of eating garden vegetables when they are fresh right out of the ground. It is not profitable for a shop employe to raise his winter supply of potatoes, if he can use his time in shop work; for the farmer who plants, cultivates, and sprays by horse or tractor power can cultivate up to 15 acres of land per employe, while the man who raises potatoes by hand finds a quarter-acre a large burden. As a general thing, gardens much larger than an eighth of an acre are not carried through successfully. A great many men will



have the feeling in the spring that they can take more than this allotment; but they will give it up when July and hot weather and weeds come all at once. It is wise to tell such men to take a small plot and prove that they can handle that well, and then take two of them the next year. They seldom ask for it the next time, however, unless there is a son or brother or some one else to help out.

It is usual for the firm to furnish the land rent free, and sometimes to plow and harrow or even to put in the fertilizer. Just how much they should do is difficult to determine. If the land is farm land there is no doubt but the work done by the employes is likely to increase its value, while if it is merely city lots that are being held for a better market, or land being held on which to build a larger shop, no financial gain is to be expected.

**9. Location.**—The location of the gardens is of great importance. They should be within easy walking distance of either the shop or the men's homes. If near the shop, they can be crowded together and the fact that all the lots are surrounded by other cultivated land will help keep weeds out as well as give the gardeners the incentive of competition. The home gardens, or back-yard gardens, will probably do well, because the whole family becomes interested. For this reason, it is wise to encourage raising some things that will be ready to eat as early as possible, like lettuce, beets, and peas; for once they begin to come on the table there will be a great deal more willingness to hoe and cultivate.

**10. Management.**—As a general thing, it is best to let the establishing of these gardens, together with most of the other more purely welfare work, spring from the employes themselves, and let the work be kept as far as possible in their hands. Those who really want gardens will influence others to start them and keep up those which they start better than any representative of the management can do it. Then, too, a poorly kept garden among a lot of nice ones is very plain to be seen, and the man's own pride will keep him at work at it until by and by he will develop enough love for

the work so that he comes out and does it of his own accord. Handled in this way, gardens are a great help in keeping a low rate of labor turnover. A man who sees something coming up in his garden will wait for a pretty good job to be offered before he will leave his job, unless the offer is unfortunately made to allow men who move from shop to shop to retain their gardens. From April to October, the gardens have a very good effect on the men that cultivate them, but it is only some real emergency that will bring much over 10 per cent. of the employes to engage in such work. During the World War, some instances were known where one-third of the employes took up this work, but ordinarily 10 per cent. is the maximum. Whatever effort is necessary to bring this number higher is well spent, provided of course that neither force nor paternalism is used to accomplish it. Probably the very best thing is to leave it in the hands of the employes themselves with a little encouragement in the way of prizes for the best gardens, and the best exhibits of various fruits and vegetables from the gardens.

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### COMMISSARY DEPARTMENT

**11. Restaurants.**—Many shops offer noonday meals “at cost,” which usually means at a substantial loss. The reason for doing this is closely connected with labor turnover. Unless the employes live within half a mile of their work they prefer to eat their lunch at the plant. They do not like to carry a dinner pail, nor do their wives like to get up early enough in the morning to put up a lunch as well as get breakfast for them. The consequence is that men will patronize whatever restaurants may be in the neighborhood, even though they may be dirty and the food unpalatable. When employes eat in this way, their afternoon work suffers. They are likely to be logy for the first two hours and get tired and have “that empty feeling” the last two.

The restaurant run for profit and in ignorance of the needs of workmen, will always offer stews that are heavy and greasy. They are cheap, because they can be made from meat that

cannot be used for any other purpose. Then there will be pies made with synthetic filling, and ice cream based on cotton-seed oil products. With restaurants run in this way a profit is always possible. No manufacturer can afford to have his workmen eat such meals. Cold lunches brought from home would be much better for them; but if they will not bring them, then a restaurant is better; but a company restaurant will be bitterly criticised if it offers meals that are of as poor quality as those furnished by commercial restaurants that usually spring up around a shop.

The question immediately arises as to just how much the shop should contribute toward this feeding problem. Most shops allow free rent, light, heat, and in some cases the product of gardens run by the shop. Even with these allowances, it is seldom that the restaurant pays its expense, largely because it does not charge commercial rates for the food. These rates have to be set with due regard to dinner-pail costs and cheap-restaurant costs. The dinner-pail cost is mostly in feeling on the part of the wife; boarding houses will seldom furnish a box lunch to take to the shop. Around some shops there will be found men with the enterprise to put up box lunches and sell them at the gate, and some of these furnish really excellent food. They can do this, because their overhead charges are entirely negligible. The cheap restaurants have to pay rent, except in case of a lunch cart; they also have to pay for heat, light, and so on; but, as already stated, they do not have to buy as high quality foods as the shop will feel obliged to furnish.

Whatever apparent loss there may be in the restaurant, however, can be most certainly made up in the production department, if only such foods are offered at noon that the men can return to work immediately afterward and work with comfort. Greasy foods should of all things be avoided. Half-done soggy potatoes should be barred out, and none offered unless they are well done and mealy. Baked potatoes are good, but if offered the same day with mashed potatoes will not be eaten. Stews are all right in cold weather, if made of sound meat, the grease skimmed off, and crackers

offered instead of dumplings, as the latter are usually heavy and indigestible. Desserts may consist of real pies; that is, pies made from apples, lemons, mince meat, and so on, and not the canned material which is so much cheaper. Real ice cream, and puddings made from stale bread, tapioca, etc., will sell well with a little dab of whipped cream, and they will be easily digested.

A compromise with the full, or complete, restaurant has been made by some shops with good success. By this arrangement the men bring with them sandwiches and possibly cake if they wish it, and supplement them with coffee and desserts at a lunch counter. This works very well, especially if in winter a good thick stew is furnished, in which case many workmen will not bring anything from home, but will make a meal out of the stew and desserts.

**12. Cooperative or Company Stores.**—Another branch of commissary work is the cooperative or company store. During the periods of high prices of foodstuffs, it has been common to find groups of men combining by subscription to buy foodstuffs in large quantities, as, for example, sugar by the carload, and distribute them among themselves. In some instances, the shops have carried this a step further, and have used their credit and purchasing power to make purchases without knowing who would buy, and then opened a store for their distribution to their employes only. This always arouses a protest from the storekeepers of the neighborhood, from whom it takes business; consequently it should not be gone into without first being certain that the storekeepers are not doing all that they should to give service at a reasonable profit. The gain to employes is not a very large one as compared with their total expenses, although it may be considerable in dollars and cents for the whole shop. If the grocers and other tradesmen of the town are unreasonable and if the employes live in a fairly compact group, the plan will probably be successful. It may, however, be met by a "cash and carry" plan on the part of the stores, which is quite as advantageous to the workmen. In any event, it is

not wise for a shop to establish a delivery system unless for flour in barrels or potatoes by the bushel or some such rather large orders that cannot be carried home by the men. Credit plans in shops are always provocative of disputes as to amount owed, and while the shop has the whip hand, it is all the more dangerous to demand exact payment of debts for that very reason.

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## RECREATION

**13. Management of Recreation Activities.**—Under the head of recreation comes that part of welfare work which has to do with games and sports, dances, hikes, singing, orchestras and bands, and any similar activities that are partly spontaneous and partly the result of organization. There are certain quite definite advantages in having such activities centered around the shop, and yet there are serious dangers if the company takes too free a hand in them, or if it lets them run with too loose a hand.

For example, under good conditions there is no better recreation than dancing. But dancing is likely to reflect the actual character of the dancers, and as the evening advances the veneer of restraint imposed by social usages is apt to break through unless the character of the participants prevents it. Unfortunately, the average character of the people of this country is not of so high an order that it is safe for dances to be held entirely unsupervised where shop employes are concerned. If dances are conducted in the name of the company, it is perfectly legitimate to insist that they be chaperoned by people who are responsible to the company; for a bad name growing out of a badly conducted dance may injure a firm through increase in labor turnover, by driving away or keeping away just the class of people most necessary to the firm's prosperity. If, on the other hand, the company goes ahead and, in its desire to give the young people a good time and better the morale of the shop, conducts dances under its own management, there is the danger that something will happen for which the company has no moral responsibility but

which will be held up against it by its own employes. The same thing, differing only in detail, applies to baseball, basket ball, rowing, and every other activity that can be suggested, with the additional danger that, in the case of competition in games with other shops, there is the constant temptation and pressure on the employment department to employ men for no other reason than that they are good athletes and will help to win the championship. There is a very great advantage in keeping all these things as purely amateur as possible, and at least in limiting them to people legitimately employed and whose services are needed by the company. There is still more advantage in having these things done entirely by the initiative of the employes themselves, but with the opportunity for the company, through its representative, to know exactly how the company name is being used. The company may very well take a hand to the extent of seeing that none of these things are conducted by a little clique of interested people and that they are thrown open to every one in a democratic way.

**14.** Well conducted, there is no doubt that sports and other social activities help to keep down the labor turnover and also to attract a great many desirable employes. The great majority of workmen have some finer sense which makes them prefer to work where the shop is clean in all ways, and yet they all want to work where things are "alive"; and by that they mean where there is something going on. Not all of them will agree as to what activities they are most interested in. Some care only for dances, some want to be amused and will go to see film comedies, but will take no active part in amusing themselves or others. Some require the most strenuous possible exercise, as rowing and other athletics, while others wish more passive games and will make up a whist club in the winter. All of these things are good, but they depend for their success, as a shop affair, on the opportunities for their exercise on a purely voluntary basis. If there is a reasonably level ball field near the shop, there will be a ball team whether the management knows it or not, and it will surely play games under the company name. If there is a good river for rowing

close by, there will be boat racing, if only in flat-bottomed row-boats and canoes. If there is a sizable lake, there will be yachting; and so it goes through the whole list. If, on the other hand, the facilities for any sport are at a distance, there is little likelihood that much will come of it, even with all the encouragement that the company can bring to bear. The artificially stimulated sport does not persist after the stimulation is removed.

**15.** All these forms of recreation, if natural and only slightly controlled by the management, are more than likely to help keep down the labor turnover and raise the morale of the place; but the slightest hint that the management or any of the foremen are trying to exploit the workmen is instantly resented. If men who are known to be capable oarsmen but do not wish to row are compelled to give up time they would prefer to put into gardens, rather than lose their jobs, then the whole thing becomes an advertising scheme on the part of the employers, and its good effect is annulled.

## EMPLOYMENT OF CRIPPLES AND MENTAL DEFECTIVES

**16. Need and Importance of Proper Employment.** When a man is injured in the shop, it is customary to give him some easy work around the shop in order to get him back on the pay roll as soon as possible and off the insurance carrier. He may carry messages or run an elevator. As soon as it is demonstrated that he has recovered and he is back at work, the feeling of responsibility for him is likely to fade away. There is very little effort to discover ways in which he can become as useful to himself as he was before, whereas he should be made so much more capable of earning money as to more than make up his financial loss. A broken leg may hinder a man's activities for the rest of his life; but often a man so handicapped can be trained for other work that may make him even a better living than before. Men who acquire tuberculosis through long exposure to wet and



then to dusty conditions need special care to arrest the disease and make a recovery possible, and they further require the kind of work that they can safely do. There is a similar need in all cases of sickness or accident arising out of employment. Concerted action toward such rehabilitation work is slow in coming about. Most of the efforts to promote such action have been made by engineers in charge of accident prevention. Usually the most effective work in training and placing crippled men can be done through joint action of the safety engineering department and the education department of the individual plants.

**17.** Mental cripples have always been present in most shops, and probably always will be. They range all through the milder forms, and, unfortunately, they usually grow worse and worse until they finally drop out altogether, for the ordinary shop atmosphere is not conducive to mental betterment. In attempting to place such mental cripples, great care should be used to distinguish between men who are only mentally underdeveloped, those who are suffering from nervous troubles, and those who are mentally diseased, though these conditions run into one another and overlap so much that one man may have all three troubles. However, the fact that a man's intelligence rates up only to that of a child of 12 years does not indicate mental disease any more than the fact that a man is only 5 feet high indicates that he is physically unsound.

The Binet tests or some of their modifications indicate the mental age of the workman, and tell what may reasonably be expected of him. A low mental age does not imply any handicap, except that the person so rated cannot be expected to think clearly or rapidly. A man of very low mental age and good physical development can do a great many things, if he is patiently taught to *do* them and is not burdened with the *reason why*. The method of teaching him is just the reverse of the normal method of teaching.

The man who shows nervousness and excessive irritability may also have a low mental grade, but that is not likely unless

he has suffered from neurasthenia so long that his mind has begun to give way under the strain. Such men usually show loss of weight and some trembling of the extended hands and fingers, they may not be able to stand still without their eyes open but may topple over. Such men need relief from all responsibility and trouble and worry, and above all from fear. This last is the most important and the hardest to overcome, for the fear is likely to be fear of poverty. Once they realize their condition, there is the apprehension that their money may not hold out until they recover, and that fear only increases the length of time needed to remedy their trouble. No such case should be allowed to develop in a shop or office. There should be some way of getting men who are becoming nervous wrecks to confide their troubles to some one who can at least give good advice.

**18.** The man with an actually diseased mind, a man who has hallucinations and who does not draw the normal conclusions from ordinary circumstances, is most likely out of place in a shop, where there is danger of his injuring himself. If only the latter manifestations appear, that is, that he does not draw the customary conclusions from circumstances, we should remember that many of the men now most famous for their help in invention and world politics have been afflicted in this same way, and that later generations have come to believe that there was more mental defect in their critics than in them.

## AMERICANIZATION

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### WHY AMERICANIZATION IS NECESSARY

**19. Early Conditions.**—The United States of America, in almost all its parts, was originally an asylum for men and women who wished varied forms of liberty for themselves. Most of them were suspicious of others who wanted any different kind of liberty, and most suspicious of the natives of the country. The process of extermination of the Indians brought the colonies into closer touch than previously, and when they united in common cause against England they became still more closely knit together. Even at that time there was a considerable variety of race. The New England states had their Puritan types which could not even tolerate each other, as witness Roger Williams driven from Massachusetts to Providence. Next came the Dutch of New York, complacent, contented, and lazy, but wily; then, beyond them, the Quakers, with a sprinkling of so-called Pennsylvania Dutch who were quite different in their characteristics from the people of New Amsterdam. Then, beyond them were settlements of English again, but of a different type entirely from those of New England. Seemingly, the only thing that could unite such a varied people was a common enemy, and that they had in plenty. For many years, all of settled America was a farming country. All manufacturing, beyond the product of the blacksmith, was done in the homes. Every home had its spinning wheel and loom. Every farmer could make his own shoes, or rather boots. Ready-made clothes and hats were unknown. Moreover, transportation was so slow and difficult that there was but little circulation of the population. Men came to this country, settled in a farming country, and stayed there for a lifetime. When the new settlers came they immediately went to the country regions

because there was nothing for them to do in the cities. Living, as they did, in an environment entirely new and strange to them and confronted with problems that taxed their ingenuity to the utmost to preserve their own existence, there were gradually developed customs, manners, ideas, community interests, and later a national spirit commonly called American. The process of Americanization, or the assimilation of these peculiar characteristics, went on rapidly among the early settlers because they were not congregated in cities and they were thrown much on their own resources.

While many of their old-world characteristics were therefore soon discarded, some of them were retained for several generations. This is especially true of the arrivals that have remained in groups, as in our larger cities and in some of our smaller communities, each settled almost wholly by persons from one foreign country. But even such persons blend their habits into the characteristic American ways to some extent, although at the same time they remain true to type. Race usually shows itself in appearances. The Jews, for example, not only in this country but in all countries, retain their characteristic facial appearance. They may be large, heavily built men in one region, and small and light in another; but they are just as certainly picked out as if they were all of one size. With the possible exception of some of the younger generation, the Irish also are readily distinguishable, as are many other races.

**20. Mingling of Races.**—When the working force consists of foreign-born people, it is very desirable from an employment standpoint that there be such a mingling of races in the shop that no favoritism may appear to be shown. A shop that is filled largely with Germans is not a comfortable place for any but Germans to work. The same is true of the other Teutonic races. It is not perhaps so true of Italians from the northern part of Italy, but to some extent it is true of all races. Then, too, there is a great advantage in a proper mixture of races, because they thereby get acquainted with one another and they learn American manners and ways of doing



FIG. 1

things a great deal more rapidly than they can if those of each race are allowed to stick together. In getting such a mixture of races in a shop, one difficulty is met; that is in connection with the nationality of the foreman. Each foreman will be likely to have a preference for workmen of his own race. The one exception is perhaps the Irishman, who is willing to boss every race and only wants to be allowed to do it. He is, however, not always a safe man for the job, because of this very propensity, which is not altogether in keeping with the times.

To arrive at a suitable mingling of races care should be taken to see that the proper proportion of races is obtained rather than merely a mingling of people from certain geographical divisions. For example, at the opening of the World War, many employers were surprised to discover how many of the so-called Germans in their shops were really Polish and Russian Polish at that. The reason was very evident. When these workmen were looking for jobs they soon discovered that a German stood a much better chance of obtaining a job than did a Pole or a Russian, and since they could talk some German, more than the employment manager, at least, they represented themselves as of that race, without any intention of doing harm, but merely to make it easier to get a job. For this reason, it is wise to make a brief study of the races that make up the working forces in this country, see where they live in the Old World, and what characteristics they have that they are likely to retain and what can possibly be changed. Actual boundaries of countries change so rapidly, and have been changing for so long, that the name of the country can no longer be used to identify the race. The approximate locations of the principal races in Europe are indicated on the map, Fig. 1. The boundaries of the races, however, cannot be clearly defined.

## CHARACTERISTICS OF DIFFERENT RACES

## RUSSIANS

**21. Kinds of Russians.**—The Russians furnish an excellent example of the inclusion of a variety of races under one national name. Men have been coming to the United States from Russia and calling themselves Russians who were really Letts, Lithuanians, Poles, Jews, Finns, and Mongols, together with a few Germans, or Teutons. In addition to these were the real Russians, who in turn are of three quite distinct types with different languages and characteristics. There are the Great Russians, or Muscovites, inhabiting the region about Moscow; then there are the inhabitants of Little Russia, or Ukrainia, around Keif. To this group belong the Cossacks, of whom very few appear in America, however. Those of the third group, known as White Russians, inhabit the country nearer to Petrograd and north of Poland. The Great Russians comprise over fifty millions of people; the Ukrainians, around twenty millions, and the White Russians, only four or five millions. The larger number of men coming to the United States are of the Great Russian group; the White Russians are more nearly like the inhabitants of Great Russia than are those of Ukrainia.

**22. Description of the People.**—Russia, geographically, is a great plain reaching from the marshes of Poland and Lithuania and the Carpathian Mountains on the west, through to the Arctic Ocean on the north, and east to the Pacific. In all this area the only variation from an immense plain only a few feet above sea level is furnished by the Ural Mountains, which in America would be considered hardly more than a series of hills. They are no obstacles to trans-continental traffic; in fact, the rivers, which flow for the most part either north or south, are more hindrance to travel than are the mountains. These rivers are of value for transportation, but unfortunately not in the direction which would be most useful. Research indicates that the small group of White



Russians is the remainder of the original Slavs who at one time swept over the whole area which now comprises Russia in Europe and Siberia, and who at one time knocked at the gates of China. As the reverse flow came from the Mongols, their blood was mingled with that of the Slavs, so that the people of the southern part of Russia, the Ukrainians, now partake of the nature of the Tartars who overran it, and the Great Russians are of a less pure blood than the White Russians.

The nature of these Great Russians is what might naturally be expected of a conquered race existing where the land is both fertile and level. They are subservient to their superiors but inclined to be domineering and cruel to their inferiors. Having been subject to oppressive and cruel government for so many generations, they have learned to use such measures with others whom they can control, and furthermore, many of them believe that their ends can often be gained by deceit and treachery. They have found also that some apparent relief from the dullness and monotony of their lives can be gained by the free use of intoxicating liquor and they accordingly look upon it as a necessity. Their cruel treatment of each other, especially of wives by husbands, is out of place here, as their younger generations are rapidly learning.

**23.** Between the White Russians and the Baltic Sea there are the Letts and Lithuanians, quite distinct in language and appearance from the Russians, but formerly associated in our minds as Russians, because the country was under Russian rule. These people number slightly less than the White Russians. They are not a well-developed race, they were the last of all Europe to accept Christianity, and they probably are the oldest and most direct descendants of the ancient Aryan race. The Letts have a language of their own. The Lettish language in the North has been considerably modified by contact with the Finns who are a part of the Mongolian race, and together with the Magyars of Hungary and the Basques of the Pyrenees speak a very primitive language much like that of the American Indians.

**24.** South and west of the Carpathians there is another large division of the Slavic race, including the Poles, Czechs, Slovaks, Moravians, Slovenes, Serbo-Croatians, Albanians, Bulgarians, and Bosnians, all of which names were made more or less familiar by the World War. Immigrants from all these countries were formerly classed as Russians, Bulgarians, or Serbians, but each group has a distinct language or dialect. These people in their home lands have become accustomed to strife and political unrest. Some of them are therefore often found influential in bringing on labor troubles, riots, etc., in America.

**25.** The Magyars and Roumanians are not Slavic, for though the language of Hungary is similar to that of Russia, the Hungarians, or Magyars, come from a different stock. The Roumanians speak a Romance language, as indicated by their name, though by blood they may very likely be more closely related to the Slavs. To all appearances, however, the races of Hungary, Roumania, and some of the neighboring regions of Europe have been influenced largely by Alpine blood, as they partake more of the mountain characteristics than of those of the Russians of the great plains. As in every mountainous country, the men are better workers and fighters than are those of the plains. Some of the most skilled artisans of Europe emanate from this part of the country, and it is well known that these regions have been in a foment from a military point of view for many years.

**26.** All these people surrounding the true Russians have greatly influenced the particular parts of Russia into which they have gone; but they have been much influenced in return. For example, the name, Russia, is derived from a root meaning red, and there is a very distinct tendency for true Russians to have a reddish cast to their hair and faces, a shade which for want of a better designation has been called "beer-colored." The degree of blondness of these people appears to be quite definitely in inverse ratio to their distance from the Baltic. The Letts are about two-thirds blond, the White Russians only a little less, the Great Russians a little less than half, the Little

Russians, or Ukrainians, a third, and the Ruthenians in the Carpathians are only about one-quarter blond. Of all these people, the West Coast Finns show the greatest tendency toward the Mongolian type, while still other inhabitants of Finland who are affected by proximity to Sweden are of a very much higher type and do not show nearly so much of Mongol in their appearance. Hence we cannot judge a man's characteristics merely because he styles himself a Finn.

**27.** In summing up the Slavic race in relation to employment in America, it may be said that the people from Central Russia, the region of Moscow, and those to the South in the vicinity of Keif are likely to be willing to do heavy manual labor, in fact they are largely found in our mines, blast furnaces, coke ovens, rolling mills, and foundries doing only the roughest work. The northern Slavic races, and especially those among the Finns, do not appear to be affected by heat, and they work around furnaces to advantage. They will take any risk, because they are fatalists and do not think it worth while to take care; they believe that if they are to be injured on a given day they will be, regardless of any care on their part, hence they are a constant burden for the safety engineering department. Only a small proportion of all these people are married when they come to America, consequently they are mobile and can be readily moved about from one city to another. Notwithstanding their home life in the fields, they like to stay near large cities.

The Slavic races do not readily become a part of America; they are inclined to be clannish and they do not respond readily to our educational system. Their children, however, seem to take quite kindly to American ways and make fair progress in schools. Like all other races that come here impelled by economic motives as distinguished from religious or other motives, those of poorest quality come first, so we should not judge the Slavic race by those who are here now. What has been here said applies to the type that is available for employment at present. Of the first generation, there does not appear to be any hope except for purely imitative work.

## SCANDINAVIANS

**28. Race and Characteristics.**—The Norwegians, Swedes, Lapps, and some Finns, together with the Danes and some of the inhabitants of the northern parts of Germany, such as Schleswig-Holstein, are the purest Teutons of all. There is some ground for the belief that this race may have come into the Scandinavian peninsula from Finland, but whether it was of a Mongolian ancestry or whether it came from a race that preceded the Finns, is not known for a certainty. It is certain however that this Scandinavian race is much more distinct than the Slavic and that it has held its own much more surely than the more subservient peoples to the east. This is a natural characteristic of people who live in a mountainous country. They must have more initiative or they do not live. In a large part of Russia, a comparatively small amount of labor is necessary in order to raise abundant crops. In Sweden or Norway only skilful work, and much of it, insures a crop at all.

The true Teuton is long-headed; that is, the width of the head from side to side is less than 78 per cent. of the length from front to back. The Scandinavians are both blond and long-headed, with the exceptions of the Lapps at the extreme north, who are short and broad-headed, and some of the people at the extreme south, *a*, Fig. 1. Most of the coast of Norway is composed of fiords which make possible a great deal of coastwise trade and are an incentive to fisheries, but this southern extremity is not favorable to either. It is populated by people who call themselves Norwegian but who depart in blondness, stature, and proportions of head from the Teutonic type.

The Swedes in America are not political or religious outcasts, nor do they come from poverty, but because their country is overpopulated and relief is needed. They are clannish here and preserve, as far as they can, many of the old-world customs. Their children, however, and the Swedes are prolific, take very kindly to American customs; while the first and second generations may preserve many customs out of

respect for their parents, the third generation does not usually feel called on to do so.

Norway, Sweden, and Denmark have developed into manufacturing countries unable to raise enough foodstuffs to provide for themselves, and thus are dependent on Russia and the United States. They have the advantage of much available water-power at short distances from the ocean, good deposits of minerals, and are a people who are generally shrewd and intelligent. They respond well to educational efforts and have not had to resort to copying of the methods of other countries. In fact, in spite of their nearness to Germany, they have probably been influenced by German educational methods even less than has America.

**29.** The early Norwegian immigrants to America brought with them little skill, but they were well educated in their own language, better than the average American so far as thoroughness is concerned. They were much addicted to strong drink; but in more recent years a wave of temperance has swept the country and their representatives in this country now are not so much inclined to excesses. When drunk they are difficult to deal with, through perhaps not so objectionable as the Finns, with whom they have much in common. They tend toward agriculture, fishing, mining, and the building trades. They contribute much toward the labor turnover in shops, as they do not like the restraint of being indoors.

**30.** The Swedes, on the other hand, incline strongly to the shops; the second generation, however, is not so willing to take manual jobs, but works its way into highly skilled positions, executive places, and the professions. The girls do the same. The first comers were house servants, the second generation are shop workers, and the next office people.

In dealing with Swedes in the shop, it should be remembered that they are a very conscientious race and that they respond to duty much better than to personal attention. They are inclined to do things as a body, so that if a leading member of their particular set will do a thing, the support of the rest may be taken for granted.

Welfare work is apparently wasted on them, as they suspect that it is done for the benefit of the company. They are much inclined to cooperative movements, such as cooperative buying, but only among themselves. They do not seem to have a great deal of faith in any except their own kind, and that is often limited to their own particular home part of Sweden. They seem to have a great dislike for their neighbors in Finland, in spite of the fact that much intermarriage with them is evident. They are inclined to be temperate so far as drinking in public is concerned, but are more inclined to drink at home or in small parties.

**31.** The Danes come to the United States in fewer numbers than do the other Scandinavians, probably because their country is not so thickly settled. They have been more greatly reduced by wars than have the people north of the Baltic, and their country is not so fertile. They are largely a seafaring race, and incline in this country toward fisheries, rather than toward the shops, although occasionally mechanics are found among them.

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#### INHABITANTS OF GERMANY

**32. Distribution of Races.**—Germany has been a melting pot of the races, but in a lesser degree than the United States. Roughly speaking, the population of Germany is composed of the Teutons who have overflowed from north of the Baltic down directly south from Denmark, the Slavs who have come in from the east, and the Celts or Alpine races which have come down from the mountains of Switzerland and Tyrol. As is very natural, the ruling class up to the time of the World War, and very likely now, were of the Teutonic race, but the great majority are of the other types with various intermixtures of other races. The people around the coast of the Baltic are blondes with long heads and these Teutonic characteristics prevail among the people in a tongue-shaped strip of territory extending through the country as shown in Fig. 1. Outside this strip the heads become broader and the build more stocky as the distance from the Baltic increases.

To the west of this Teutonic region the racial characteristics partake of the Celtic type and the characteristics of the latter become more and more pronounced as the distance west increases, except in England, the most pronounced type of the Celtic race being in Scotland and Ireland. From a strictly racial point of view the people of western Germany, Holland, Belgium, and northern France have many characteristics in common. The people of the Teutonic type are fearless, thoughtful, reasoning; those of the Alpine type are crafty, politic, and subservient when necessary. Both are strongly cooperative, though not easily led.

**33. Characteristics.**—Germany has promoted its birth rate both by encouraging marriage and by complaisance as to the fatherless. Consequently it has followed the only course that is possible for a country surrounded by fixed limits. It developed its underground resources and promoted manufacture, and, as the population increased, the cultivated acreage per inhabitant decreased until, just before the World War, the country was sending out all the emigrants that it could get to sever home ties, and was suffering from overpopulation. Whether the population has been sufficiently reduced by the war so that there will again be elbow room is problematic. Germans have not been successful colonists. They do not apparently desire to mix with other peoples, but prefer to go among them in a sort of over-lord fashion. They have been most successful in America, and in North America rather than South, though in South America they have made great efforts to secure a foothold.

So many excellent mechanics came to the United States from Germany previous to the World War, that it seemed superfluous for us to train our own sons for places in our shops. We were spared the very considerable expense of this training, only to find when the war began that the country was more dependent on German artisans than was desirable. Fortunately, these people did not have the intense antagonism toward the Allies that their home people evidently expected, and shops manned almost entirely by people who were at



least of German parentage were very helpful during the whole war period. The proportion who declined to follow their adopted country was very small.

**34.** As artisans, possibly those from the southern part of Germany, the Bavarians, have a slight advantage; but all the Germans are by training much more thorough than the American-trained young man, unpleasant as it is to have to admit it. Advancement in that country is not so easy nor so rapid as here. The older people are more inclined to retain their authority over the young. Moreover, there is a much greater tendency of both business and government to recognize the value of science and to support it liberally. This has resulted, not in any great addition to the new things in science, but in a great thoroughness of detail. For this thoroughness the Germans are deserving of credit, because they have made practical and commercially usable many things which inventors of other countries have been willing to leave undeveloped.

While, as has been shown, the German people comprise three rather distinct races, they have so merged together in families and in their educational, business, and army systems, that they have become blended into a unit. Included in this statement should be the people of Austria, who have remained even more German than the Germans. In the United States Germans and Austrians are not distinguishable except as they give their birthplace.

Beyond Austria, and divided from it much more sharply than is usual in Europe, are the Hungarians and the other more truly Slavish races which meet the Serbians and Roumanians to the south. South of Germany lies Switzerland and Tyrol with their Alpine people who blend in the northern part of Italy with the more strictly Mediterranean people. On the west it seems that Germany has been given more territory than belongs to it from a racial point of view. This racial line may be as far to the east as the Weser River, certainly east of the Rhine.

**35.** The people of Alsace and Lorraine, who are now classified geographically as French, are typically of the Alpine

stock. There is an undoubted feeling of this among them, and an allegiance of the heart if not of the head to Switzerland. Thus they form an ethnographic promontory, or tongue, projecting into the Celtic race just as the Teutons project into the space between the Celts and the Slavs in central Germany.

#### ITALIANS

**36. Characteristics.**—In the time of Cæsar, Italy reached to the north only to the Rubicon. Today that little stream is only a little north of another boundary line which marks a very decided difference in the races of the country. In the northern part of the country the people living on the southern slopes of the Alps present the same racial characteristics as do those residing on the northern slopes in Bavaria. The Alpine people extend into the valleys and fill the northern part of what is now Italy, but in the southern part of Italy the Appenines are inhabited by a very different race characterized by shortness, dark skins, and long heads. In each of these traits they resemble the people of the adjacent coast of Northern Africa. This does not by any means connect them with the Negroes, because they are permanently separated from the latter by the Desert of Sahara, so that the north of Africa is as strictly Mediterranean as is the south of Europe. In fact all these races that surround the Mediterranean must necessarily be much alike, because they have conquered one another from the earliest times and the conquerors and the conquered have mingled until they have very similar characteristics. Among themselves, however, there are as great distinctions as we find in different portions of the United States.

**37.** These Italians from the southern part of the country came to America in great numbers from about 1895 up to the time of the World War. Then they went back, impelled by a love of their home country and possibly in some cases by the laws which they feared would debar them from ever returning if they did not take their places in the army. However, very few Italians come to America without leaving behind

some one who is dependent on them and for whom they have a real love. It is likely that this desire to protect their own people had quite as strong a pulling power as any other force. In the appearance of these people there is not much to remind one of the power of Rome or of the conquests of Cæsar, and yet there is not much to indicate that any great changes have taken place since Cæsar crossed the Rubicon. The people, even those from the mountains, are short in stature, and apparently not adapted to hard and laborious work. Yet for a long time they have built our railroads, dug our ditches, and in other ways inherited the burden which the Irish had just laid down. More recently, however, they have tended toward the mills and factories, as they learn so-called semiskilled work with great celerity. The first comers were from the farms and vineyards and naturally took to the soil here, but the need of money to send home was so great that they persistently sought it where they could find it. They came here, not with any desire or intent of becoming Americans, but to get money to support their distressed people at home. The country was becoming overpopulated and the customs of these southern countries prevent a man from working after the age of fifty if he has relatives that can possibly support him. This and the tendency toward large families, by which the parents insured themselves against personal want in their declining years, has had a great influence on their work and customs in America. It is rarely that an immigrant from the south of Italy will live in a manner that resembles the American scale of living. He is unusually thrifty, builds himself the veriest shack, lives on the least possible food, and saves money, some of which he sends home and some he invests. For the most part, Italians have a fondness for investing in real estate. American bankers usually feel safe in making loans to Italians on real estate security, because an Italian will rent a dwelling to more people than can a man of any other nationality unless, possibly, a Jew. This is possible because the majority are single men whose only idea of a home in America is a place to sleep, and they are satisfied with the places just vacated by other men on the night gang.

However, the fact that the Italians in America are so largely single men makes them very mobile and, therefore, inclined to increase the rate of labor turnover. They follow the high labor rate, and wherever semiskilled work or unskilled work is the most highly paid, there they will soon be found. The worst features of the old *padrone* systems have disappeared, but it is still possible to hire Italians by the hundreds by appealing to their leaders. A small fee from both the men hired and the employer is all that is now required and the system of practical slavery to the *padrone* is not much found.

**38.** In spite of their small size the Italians have great endurance, and can and do work a larger percentage of the day than any other of the races. They do not spend so much time in argument or lighting a pipe as the Irish, nor do they work so moderately as do the Slavs. They bring with them a necessity for excitement, which they indulge by petty gambling, and most of their contact with the law comes through the quarrels that arise over this gambling. They are likely to use knives, but inflict astonishingly little injury compared with the show of fighting which they make.

They do not appear to have any very marked sense of duty except to their parents. They do not consider it morally wrong to loaf when the boss is not around; a dependable boss is therefore necessary for each group of such laborers, however small the group. They do not band together strongly, though, and are not usually good union men nor good cooperators in any way. These statements apply to the mass of Italians who come from southern Italy and from adjacent islands, such as Sicily, Corsica, and Sardinia, although the undesirable characteristics are usually more pronounced in the islanders than in the men from southern Italy.

**39.** The people of northern Italy are very different. Few of them come to this country and they are seldom recognized here as Italians except possibly by their names. They are more like the Swiss, particularly the French Swiss. In fact, in Lombardy the Alpine type is found even more definitely and purer than in Switzerland itself.

## SWISS

**40. Varieties of Peoples.**—In spite of the natural fortifications with which the countries in the Alps are surrounded, they have been the scene of much shifting of peoples; indeed, it is remarkable that there are any remaining traces of the original population. In this little area, French, German, and Italian are recognized languages today. There are classified five German dialects, sixteen French, and eight Italian, and if Tyrol is included, five varieties of Romansch, a degenerated Latin language. If the form of the head is taken as an index of the solidarity of race, all of this Alpine region is a unit, as the people are all of the round-headed or broad-headed group. Through the center of the Alpine country from north to south there is a strip of country that is strongly Teutonic in population. This continuity of race is shown in an unusual combination of head proportions, the head being narrow and short, so that the profile looks like that of the surrounding broad-headed people, but the face is narrow and high, more like that of the Teutons. Another great difference from what has come to be considered normal in the rest of Europe is that the most blond people are the shortest. It appears that this region has had three periods, first when the native Alpine people filled the fertile valleys, then the Teutons came down from the north and drove the natives to the hills and mountains and appropriated the valleys for themselves, then the Slavs came in from the east and did the same thing. Then, gradually, the Slavs gave way before the peaceable infiltration of the Alpine people from the mountains, and they, being the stronger race in point of endurance and productivity, have reestablished their former position, but always with effects of the other races clinging to them.

**41. Characteristics.**—The Swiss people who come to America are about equally speakers of three languages—German, French, and Italian. They come to stay and to become Americans. They are farmers, mechanics, or personal servants, in which last occupation, however, they are not nearly

so numerous as formerly. Not very long ago nearly all hotel waiters in America, excepting of course the negroes, were from the highlands in and surrounding Switzerland, while now the number is much less. As they become Americanized it is difficult to distinguish them, and particularly so in the second generation, from Americans of so-called Anglo-Saxon stock. As farmers they have made marked success, as, for example, in cheese-making in Wisconsin. In the shops they take kindly to the fine work such as is found in watchmaking, jewelry work, and fine toolmaking. They are not clannish, learn English readily, in fact usually know something of it before they come. Coming from a republic, they fit in with our political customs, but seldom attempt to secure political preferment. They are organized in their own guilds or trade unions, but do not appear to be much inclined to take action leading to strikes. In fact, their organizations are for self-improvement rather than for class advancement at the expense of others.

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#### FRENCH AND BELGIANS

**42. Racial History.**—France and Belgium are racially one, with the exception of the northern part of Belgium, which is inhabited by people who are as Dutch as the inhabitants of the Netherlands. The few immigrants who come to America from these countries need only the least of Americanization. They come, when they come at all, from strata above the bulk of contributions from the rest of Europe, and they come to stay and to become a part of their new country, and in another generation become indistinguishable from the people of Anglo-Saxon stock.

The history of the country indicates that in early times it was held, in all except the border of Spain, by the Alpine race or the Celts. They were the victims of a number of invasions from the long-headed Teutonic tribes. These invaders were attracted by the fertile valleys of the principal rivers and swept nearly all the country with the exception of the western corner of Brittany, where there appeared to be so little to sustain life or to attract it, that they allowed the Celts to

remain. The result is that this corner of Brittany remains one of the few spots where the Celtic language is spoken. At the very extreme south of France, near the Pyrenees, there are remnants of the Mediterranean tribes from the Spanish Peninsula. The country occupied by France and Belgium has been successfully conquered a number of times, but has always reverted strongly to the Teutonic type which drove the Celts into a corner. Yet it should be borne in mind that the Celts have had a large influence on their conquerors, and that the inhabitants of all the country east of the Oder River in what is now Germany have been affected by this same reversion. There are also in France little spots such as Normandy, *b*, Fig. 1, which, as indicated by its name, is Norman, and various other shore settlements which are strongly suggestive of the pirates of Saxony who had their landing places here.

There is in the southwest corner of the country a fragment of the Basque race, indicated at *c*, Fig. 1, which is picturesque but of little influence on America, because of its smallness and the small number of its people who have ever come here.

**43. Characteristics.**—Of the French in the United States there is little that needs be said. They incline to trade and commerce, manufacturing, and farming. They are social, they make friends easily, and they are trusting, sensitive, and easily offended, more so in fact than are the majority of our native population. They cooperate with each other and are inclined to form societies of their own; they do not colonize to any great extent, though there are occasional attempts to maintain the use of the language in this country. As immigrants, they are held in high regard in this country.

**44.** The foregoing statements apply to the real French people. The half Indian and half Frenchman from Canada, the Canuck so called, is better though less favorably known in the United States. In northern New England he does the wood chopping, and works in the textile mills and shoe shops. These people adapt themselves to American customs so far as



politics is concerned, with no apparent effort; they are much inclined to go in swarms and to keep together, rather than to spread themselves out in a region and mingle with the native population. Although they are physically strong and wiry, a combination of bad liquor and exposure to bad weather is producing a large number of consumptives among them.

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#### SPANISH AND PORTUGUESE

**45. Characteristics.**—The inhabitants of the region south of the Pyrenees are racially the same and differ only in language and political government. The Spanish peninsula is a high plateau, except a non-productive strip around the coast, which is too hot and dry in the summer for the vegetation of the temperate zone and too cold in the winter for that of the tropics. The inhabitants of the peninsula came originally from Africa and are related very closely to the Moors and the people of Tunis. They are brunettes, short of stature and with the characteristic long heads of the Mediterranean people.

Very few Spaniards come to the United States directly; many of those who are in our shops came from South America where they have become accustomed to ways different from their own and are ready to take on new ways here.

**46.** The "Black" Portuguese, from the mainland of Portugal, are sailors, mill operatives, and, in some cases, farmers. In the United States, they chiefly center around New Bedford, where they do all the different things in cotton mills. They learn routine work readily, and the whole family works, so that they are specially adaptable to mill work. Moreover, they have a different conception of the truth from ours and do not hesitate to state the age of a child in whatever way will be most profitable to them. They come to stay, bring their families, and have large ones. They are inclined to organize among themselves, but they also join other organizations. They are not much given to socialism, but are inclined to be thrifty and to possess themselves of whatever they can.

The "White" Portuguese come from the Azores, and are of the same race as those on the mainland, but very much larger, stronger, and more blond. As would be expected of an island people, they incline to the water, to fishing and navigation.

#### GREEKS, BULGARIANS, AND OTHER BALKAN PEOPLES

**47. Characteristics.**—The Balkan peninsula with Greece at the lower extremity is a part of the lands surrounding the Mediterranean as much as are Spain or Italy, and yet its situation is different, in that it is not cut off from the rest of Europe by mountain chains as are the other two peninsulas; also, its rivers flow more toward Asia than toward the rest of Europe. These differences have made possible a more complete mixture of the population with the races north, and with the Asiatic tribes. The whole peninsula, with the exception of the plains of the Danube, is cut up by hills and mountains into small "pockets," in which not enough people can live to form separate nations, and which are not easy enough of access to one another to make it possible to combine them in stable units. The people of these pockets are constantly making new alinements politically and tiring of them quickly. Most of their quarrels have been family affairs and have not caused any considerable bloodshed, but in some instances they have set fires that have been hard to extinguish.

**48.** The ancient Greeks are known to have been a people able in many ways, and they described their heroes and gods as tall and blond, but the Greeks of today are the reverse of that in appearance. It is not known whether the ancient Greeks' admiration for size and blondness was because they aspired to those qualities themselves or whether it was in self-admiration and the race has changed by contact with other races. It should be said, however, that the fact that a man calls himself a Greek has no very great significance, as it may be that he merely speaks the Greek language, the language of Turkey in both Europe and Asia to a great extent. Greek is said to be almost as much used in Constantinople as is the Turkish language.

The Greeks in the United States are fairly adaptable to our conditions, but not much inclined to our customs. They are merchants on a small scale, they are restaurant keepers, do farming, and make valuable contributions to the number of our sailors, as might be expected from the location of their country and their ancient and modern reputation as sailors and travelers by sea.

Most of the immigrants from Greece come to make money and with the intention of returning with it and spending their old age, beginning at fifty, at home. They do not often bring their families with them, but leave parents, wives, and children at home and send them monthly payments. They bring very little with them except a willingness to work and a disposition to use so little of their earnings for food and shelter that they are not always in a physical condition to do the work that they might. They bring no mechanical ability, and, with the exception of the sailors, bring no particular knowledge that is of value here. They obey orders when they understand them; but they are much inclined to say "yes, yes" to anything, and then try to find out from their fellow workers what the foreman said. They do not drink very heavily, drunkenness among them usually being due to the stronger and less pure liquors which are put before them in this country. They, like the Southern Italians, are vegetarians to a great extent, and as they are so saving in food they are inclined to eat fruit and vegetables that should be condemned as unfit for food. They suffer as a consequence, their chief ailments being those of the digestive organs.

All welfare work is wasted on these people; all that they are here for is money, and the only appeal is something that increases the difference between income and expenditure. As workmen, they become machine-like, and they do not learn trades readily; if they work in a mill, it is to get money to set up a fruit stand or go into business in a small way.

**49.** The Bulgarians, Albanians, and all the people of the Balkans, with the possible exception in some ways of the Roumanians, have some of the Greek qualities but are more

like the Slavs and some of them are more like the Turks. The Balkan races are more quarrelsome and more inclined to drink and to crime than are the Greeks.

Not a great many Turks reach the United States under the name of Turk. They correspond in the shops quite closely to the Slavs. They bring nothing except strength and an anxiety to get a job, but no very great idea of keeping one, and they therefore contribute to the labor turnover out of proportion to their numbers. They are servile, except that when they become storekeepers and employers in a small way, as they occasionally do, they are anything but kind and reasonable employers.

#### ARMENIANS AND SYRIANS

**50. Characteristics as Laborers.**—During the World War, the Armenians and the Syrians were welcome additions to the shipbuilding crews in the United States. The Syrians excelled as riveters, as they have the strength to stand the jar of the pneumatic hammers. The Armenians are not often of a higher grade than laborers, though they sometimes become small storekeepers and peddlers. There are, of course, highly educated and cultured Armenians, who are not so often seen in America; the Armenians that we see are driven from their homes and are really refugees without hope or desire to return. They do, however, pretty faithfully keep up remittances to their old people who cannot make the trip. Syrians, however, come for the money which they hope to carry back, and do not form a very helpful part of the country's working forces except as they have the physical make-up to do some of the hard and disagreeable jobs.

#### MAGYARS AND ROUMANIANS

**51. Location and Characteristics.**—As shown on the map, Fig. 1, the Magyars and the Roumanians separate the Slavs of Europe into the northern and southern branches. The Magyars are the ruling class of Hungary; they are, like the Finns and Basques, remnants of an ancient civilization

and have a language of their own. Next to them is Roumania with its distinctively Latin language. The two nations are changing in opposite ways. The Magyars are becoming less and less of a majority within their own bounds and the Roumanians have advanced their language appreciably into Hungary. The Roumanian is a comparatively new race, thought by some to be related to the 250,000 Romans who were sent to occupy and colonize the conquered province of Dacia. Roumania occupies the plains of the lower Danube, which are rich and fertile, and it has the benefit of this navigable stream. Up to the time of the World War the country prospered.

Apart from the professional men, the Hungarians who come to the United States are not sufficiently characteristic of the country so that we can judge it fairly by them. These immigrants have come here in search of adventure and in the hope of greater economic rewards. They colonize by themselves, which is natural, as they find difficulty in changing from their language to English, owing to the great and fundamental differences. They do heavy laborious work only. The same characterization applies to the Roumanian immigrants to the United States, but their children make much more apt pupils in schools, and they give evidence of a latent culture as soon as they acquire a little money and acquaintance with our ways. The second generation is very little different from our native young people.

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#### IRISH AND SCOTCH

**52. Celts of the British Isles.**—The Irish and Scotch are here mentioned together because of an evident common ancestry. Both races, together with the Welsh, though they can all speak English, also speak the Celtic tongue, at one time the language of almost all of western Europe, but now driven into what were in former times the inaccessible or undesirable corners of the country. Except in the British Isles and in Brittany, the language has disappeared, and yet it is quite certain that the Celtic race is largely responsible for the early civilization and progress of the western part of Europe. So

far as head forms indicate, there is very little difference in race over the whole of the British Isles. The people are all long-headed. The races of the British Isles have been greatly influenced by the penetration of the Angles and Saxons, two tribes of northwestern Germany whose piracies made a great difference in all of the coast of France and Great Britain. The advent and retreat of the Roman people appear to have had almost no effect on the remaining population; theirs was only a conquest, they did not stay to be absorbed and assimilated by the conquered. The Angles and Saxons contented themselves, probably because they could not do otherwise, with the parts of England and Lowland Scotland that were available for agriculture, and drove the Celts back into the hills. Ireland, less accessible, did not receive them at all. The various peoples of the British Isles were all represented among the early colonists of the United States, so that the later comers of the present day fall readily into the ways of the country, and Americanization is not much of a problem in their cases.

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#### VARIOUS RACES

**53.** Besides the people of the races already described, there come to the United States immigrants from all parts of the world and of various races. Among these are the Chinese and Japanese, the Hindus, the Mexicans, the Philippinos, and the West Indians. These races are usually easily identified as they are on a very different plane of civilization from that of the European races.

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#### ASSIMILATION PROBLEMS

**54. Susceptibility of Different Races to Assimilation.**—The assimilation of immigrants into the population of a country so that they will become true and loyal citizens is, so to speak, a process of digestion. As in the case of a man's diet, some of the offerings are digested easily, some only with time, and others seemingly not at all. The people of the United States are just now beginning to have the feeling

of a man who up to the age of fifty has eaten anything and everything to satiation, but who discovers that if he will have comfort for the rest of his life, he must use discrimination and moderation.

Unfortunately, we have not in the past entirely assimilated all of the people whom we have accepted. Experience during the World War showed plainly that many who were drafted had not felt the call of duty to this country. We could not expect that every German, or, to use racial terms, every Teuton, would have become so imbued with our spirit that he would voluntarily have taken up arms against his home country, and yet that is precisely what our own ancestors did at the time of the Revolution. It did seem, however, that all the other races whose allegiance was with the allies or was divided would naturally support this country without hesitation; and yet it is doubtful if an army of even a million men could have been raised here on a purely volunteer basis. It must be remembered that many men volunteered because they expected to be caught in the draft, and preferred to make their own selection of a "safer" service than that of a private. How far men of the southern part of Europe were impelled by fear of disgrace if they did not return to their native countries to fight we can only guess, but it is certain that they returned in great numbers previous to the entry of the United States into the war, and after our entry there was very little trouble in inducting them into our own army.

The problem of assimilation is not, however, solely a problem of a man's love for a country. It involves his willingness to be assimilated and his ability and inclination to do his part. In the United States, the assimilation of the English, Scotch, French, Northern Italians, Belgians, Dutch, Swiss, and, until 1914, the Germans, has been assumed to take place without difficulty. Consideration of the reason for this ease of assimilation may help to make plain what may be expected in other cases. All these races are Christian; all are people who are in the habit of living in much the same way that we do, and, with the exception of the Germans before the World War, they lived under very similar forms of government. To be



sure, England, Belgium, Holland, and Italy had and still have monarchs, but to all intents and purposes the people had as much part in the government as they saw fit to take. We may have had more privileges, but we are less inclined to exercise them at the polls. All of these people have a mixture of the long-headed men of Europe with some changes wrought in past ages by contact with the broad-headed people of the Alpine stock of Central Europe.

Examples of assimilation are frequent in history, which shows that nations conquered in war are often by no means lost. In almost every instance where a conqueror has sought to enjoy his conquest, he and his people have been absorbed so that they became of the nature of the people whom they supposedly had subdued. England, conquered by the Romans, was not affected by them because the conquest was a military invasion only; when the Romans retreated, they had made no impression on the population and they had received none in return. The Chinese have been conquered and have absorbed the conquerors, little impression being made upon themselves. The conqueror in each case became Chinese.

**55.** It should also be remembered that the people of the United States were never purely English; the first settlers were from several races forming the civilization of Western Europe. All these people appreciated the need of schools. They looked on learning as a precious thing and as one of the privileges that was worth fighting for. They founded colleges almost as soon as they had roofs over their heads. To be sure, they worshipped the form of education that mystifies and deals in dead languages, but in that they had a common sentiment. Such people needed only to learn a common language and to use intelligence about doing as others did. All of them spoke languages that basically were so similar or so impregnated with Latin that it was easy for them to learn English.

With some of the other races, conditions are different. The Swedes, for example, are accustomed at home to a scale of living that compares well with that in America. They are

necessarily thrifty; they are inclined to education, especially to practical education, and they profess the Christian religion. They find little difficulty with the English language other than that they retain an accent which often persists even in the second generation. They come here, however, not merely in families, but in communities. Some of the younger married couples may be the first to start from some Swedish village, but they come to make it easy for the older people to follow. Soon the village has "swarmed" much as bees swarm when a hive becomes crowded. Swedish people live together in communities no matter where they go. Their children necessarily go to public schools and they are quick to learn, but they have to learn their own language at home, and also their folk dances and their general customs. Almost every family is able on occasion to produce a full supply of Swedish costumes for festival days. From this it is apparent that the second generation becomes only partly assimilated and that it is necessary to wait for the third generation to approach maturity before the process of assimilation is complete so that there will be nothing to indicate their ancestry. The Danes and Norwegians are very much like the Swedes in these respects, but they do not come in such large groups, as a rule, and therefore they get on better with us, and are sooner assimilated.

The Finns, on the other hand, are not accustomed to our ways of living, their language is so elementary that they have considerable trouble in picking up ours, and they come from a very different race. They are not yellow men, but they have so much Mongolian blood that they partake strongly of the things that seem to make it difficult for us to assimilate them. Their children make much better progress in school than might be expected from the appearance of their parents, but they do not as a rule equal the Swedish students. Another difficulty is their tendency toward socialism, anarchy, and later Bolshevism. They are subject to the same release of pent-up emotions as the Russians, and in the exuberance of finding themselves in a free country they overlook the fact that liberty is freedom to do anything that does not interfere with the freedom of another to do the things he wishes to do.

**56.** In general, the Russian, whether from White Russia or Ukraine, or from Poland, is assimilated slowly. He has never lived in our way, his religion is so much a matter of formality that he does not know what religion is from our point of view. He is driven here by fear, either of want or of force; and a man who is afraid of anything, no matter what, is not easily won over; if his fears are imaginary he is just that much harder to win. While the Russians live together, they do it more from economic reasons than as a matter of social isolation. Their children usually have a hard time to keep up to the standards of the public schools, and as a consequence do not often complete the grammar grades.

While the Russian Jews take the name of the country in which they reside, they are not of that country. They are boarders only, not citizens in the true sense of the word. Through all the years of their wanderings they could not have preserved their racial characteristics if they had not refused all contact in a social way with the people among whom they live. It must be admitted that their ways are good. They average to live almost exactly 50 per cent. longer lives than the Americans. They live frugally, but well when they can and at the same time save the amount of money that they have planned on. They maintain their own charities, and they administer them better than do the Gentiles. There is no scandal about their expenditures of money, and it is seldom that a Jew is allowed to suffer from poverty and need. Their position is one of their own taking, and Americanization seems to be totally out of the question. To be sure, they send their children to the public schools, and they are apt pupils. They dress like Americans, and yet it is seldom that any one doubts for a moment whether any one individual is a Jew or not. The best that can probably be hoped is that they will not make their racial prejudices and methods so obnoxious to us as they have to other races in Europe and so bring on themselves the injunction to keep on traveling, as they have in so many other places. It is to be hoped that their educated men will see this danger and guard against it.

**57.** The southern Slavs, regardless of their particular country, whether Serbs, Bulgarians, Slovenes, or Slovaks, are like their Russian brothers as regards Americanization. The Magyars and Roumanians, however, are more amenable to our methods, with the possible exception of the Slavs in Hungary, who call themselves Hungarians because it appears to impress us better. These Slavs form the larger part of our immigrants from Hungary; those from Bohemia fall in with our ways much better, as they are more largely of a better class in their own country.

**58.** On the western coast of the United States, the Chinese and the Japanese form what is known as "the yellow peril." A few Hindus also come to the western states. There appears to be no chance that we shall wish to assimilate these people or that they will wish it. They are anxious to retain their individuality and we have little desire that they do otherwise. This is not solely an American idea. All white people bordering on the Pacific and adjoining seas feel the same way; in Australia, Cape Colony, everywhere that there are white men that come in contact with the yellow men, the feeling is the same. Two difficulties appear prominently; one, the entire difference in blood, with its barrier to intermarriage; the other, their different mode of living. The Chinese will live on a vegetable diet of the most limited amount and appear to thrive where a white man would starve. The Japanese are a little above this level and the Hindus not much different. Consequently, persons of these races have been imported into America to the immediate profit of contractors who were able to secure pay for their services on the basis of the American standard but who hired them on the Asiatic standard. Whether the fault lies with individuals or not, the importation of people of such races has been the cause of serious complications.

**59.** In the western part of the United States, the Mexican population presents an assimilation problem that is different from those arising from immigrants in other parts of the country. Some of the border states were originally Mexican;

and Mexicans, mostly of the peon class, still constitute a large part of the population. To what extent these people can be assimilated is as yet uncertain, but it is probable that, as the underground riches of these states are developed, the influx of people from other states will change the ratio of the population, and that the Mexicans will either do as the rest do or will gradually move south across the border where conditions may be more to their liking.

**60. Methods of Americanization.**—A great many persons confuse the idea of citizenship with that of Americanization. They establish evening classes in English which practically “cram” the candidate for the examination for citizen’s papers. This produces results, so far as swelling the voting lists is concerned, but it injures the country more than it helps; because it permits many to vote whose only source of advice as to how to vote comes from ward bosses and their heelers. It is a favorite plan among the lesser elective officials to appeal to their constituents by demonstrating to them that they can secure them personal advantages and privileges. Many times the so-called privilege secured is merely a right which the constituent could obtain immediately on application to the same person to whom the politician goes. If such practices are to be put down, these newcomers must be taught not merely to read enough English to qualify as citizens, but enough so that they will become discriminatory in their reading, and be able to read both sides of any subject on which they are to vote, or to listen intelligently to the claims of all contestants for office.

**61. Social Contact.**—If foreign-born residents are ever to become good American citizens they must be treated in such a way that they will enjoy themselves here and learn to like American institutions. These results are not likely to follow if we look upon them with a feeling of superiority and constantly refer to them somewhat contemptuously as “foreigners.” Even though they group themselves in one section of a community and do only the most menial tasks, they can be greeted pleasantly and made to feel that they are not unwel-

come here. A cheerful "Hello, Jack" or "Good-bye, Jerry" helps much toward making them feel "at home." The intermingling of children in the public schools and elsewhere is far more effective than any educational efforts with the adults, although the latter should not be neglected.

**62. Incentives to Non-Americanization.**—Now every city of any considerable size has its list of foreign-language newspapers, many of them dailies. The various nationalities have their societies, their markets, and their entertainments; in fact, in any city of over 200,000 inhabitants there is very little incentive for a man from any of the countries which contribute heavily to our population to try to become any more American than his daily work demands of him.

This is our own fault. We have made the serious mistake in the past of letting it become profitable for foreign-language papers to exist, and we have made the mistake of driving these people to trade at their own stores. To be sure, most of the papers preach Americanization and most of the foreign stores are careful to offer goods that will be attractive to native people as well as their own. The contrast, however, is great. Let a native go into a foreigner's store and he is waited on quickly and made to feel at home, but when a foreigner goes into a department store, he *may* be made to feel at home, but the probabilities are against it; and yet the clerks may be the daughters of his own neighbors. They simply follow the lead given them by their employers. During very recent years this has changed a great deal. Men who would formerly have been cowed into retreat from the best stores have pushed their way in with pockets bulging with money, and have bought their way into the good graces of the storekeepers. Favor bought with cash, however, is not likely to be kept up after the money is exhausted.

**63. Whose Duty is Americanization?**—It is trite to say that the work of Americanization is the duty of all of us and as necessary for the preservation of the traditions of the country as it is for us to take up arms against an enemy.

All history shows the effect of a peaceful invasion by foreigners. Just so surely as they are a marriageable people the women natives will marry the men, possibly to reform them, possibly out of pity. This is already evident in this country, for a large proportion of the men taken into the army during the World War were of mixed parentage. There appears to be no bar to marriage between any of the Caucasian races, but of course in every marriage between individuals of races that are not on the same level of civilization the next generation will be on a level between those of the parents. We dislike to admit that any of the peoples coming to this country are of any higher culture than we, consequently the situation is dangerous.

Much work is being done by large employers to help familiarize these newcomers with American institutions, and good results have followed. But such work is too often looked upon by those whom it is meant to benefit as only another attempt at exploitation. They reason that the concern employing them exists to make money and they cannot believe that any department of the business is maintained for any other purpose. In other words, they think there are selfish motives back of it all and the benefits are correspondingly lessened.

The work of Americanization, therefore, is much more effective if done through organizations supported, if necessary, by contributions from shops as well as by popular subscription. An independent organization stands in a great deal better light before the workmen, and there is not the danger that a man who is working in one shop today and another tomorrow will have to give up his studies on account of the change. For these reasons, it appears that Americanization, while of value to a shop, is not a function of any one shop.





# TRANSPORTATION

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## A GENERAL VIEW OF TRANSPORTATION

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### INTRODUCTION

1. One of the most important factors in business is to get property transported from the mine, the factory, the wholesaler or other origin, to the point where the property is needed, and to get it there economically, safely, and as quickly as circumstances may require.

There was a time when it was thought that the shipping problem could be solved by putting the goods in any kind of packages that happened to be available and then turning them over to the transportation company with the least possible expenditure of effort. If the shipment arrived at its destination in the condition shown in Fig. 1, because a flimsy second-hand container had been used, if the charges were much more than they would have been if the shipment had been properly described, and if the shipment took twice as long as it would have if it had been shipped over some other route, these things were regarded as matters that could not be helped. Developments in recent years, however, have made it necessary that such matters be properly handled. Cases in the condition shown in Fig. 1 are now looked upon as an evil that can and must be prevented. When shipments are rejected by the transportation companies because of insecure packing, or customers are lost because the goods arrive in bad order, the shipper finds that packages that do not carry the freight are very poor investments.

It is the object of this and the following Sections to portray briefly and in plain language those factors which must be taken into consideration to secure the best results in the movement of property from the shipper to the receiver. These matters



FIG. 1

will be explained in general language; and in order that the reader may be able to adapt the information given to his individual requirements, he will, where it will be a help to him, be referred to the sources of original or official information, so that he can consult them himself and get the facts that apply directly to his own conditions.

### STEPS IN MAKING A SHIPMENT

2. A shipment between points in the United States is called a domestic shipment, and the steps to be taken in connection with the forwarding and receiving of such a shipment will now be described.

3. **Packing.**—The first step in making a shipment is packing. Proper packing requires adequate protection for the goods, consideration of the wishes of the customer or consignee, and compliance with the regulations of the transportation companies.

What constitutes adequate protection will depend on the nature of the commodity shipped; that is, whether it is a liquid or a solid, whether or not it is easily damaged by rough handling or by weather, or whether it is such as to invite pilferage.

In many cases, particularly in the foreign trade, the person placing the order may specify how the shipment is to be packed. That is, he may ask for special waterproofing inside the package, or that the packages may not be above a certain weight, etc. As he knows the conditions under which the goods are to be handled, his wishes should be carefully complied with.

Finally, the regulations of the transportation companies must be complied with. For domestic shipments, these regulations are found principally in freight Classifications, though some of them are applied without the authority of any printed instructions.

4. The published regulations of the transportation companies, supplemented by the authority given to the transportation companies to reject shipments not properly packed, are intended to insure adequate protection of shipments. After all, however, the shipper is generally the one who should possess the most complete knowledge as to when the shipment is fully protected. Therefore, while he cannot make shipments that do not meet the packing requirements of the transportation companies, he should not be satisfied with merely complying with the regulations, if his judgment tells him that more pro-

tection is needed. For example, the classification may allow the shipment of an article without any packing, but the particular form in which a certain article is offered for transportation may be such as to require some kind of protection. In such a case, merely complying with regulations may serve the purpose of enabling the shipper to collect a loss or damage

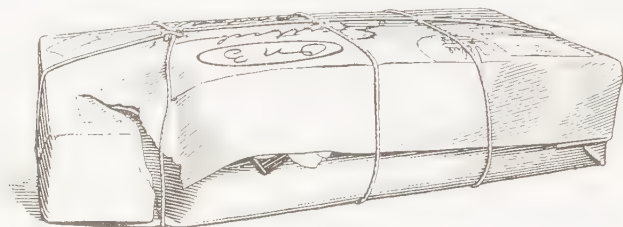


FIG. 2

claim, but it will not bring back a customer who leaves him to buy from the man who packs his goods so that they will be delivered in good condition.

That improper packing does not necessarily involve any visible violation of transportation regulations is demonstrated by Fig. 2, which is an example of a package that came to

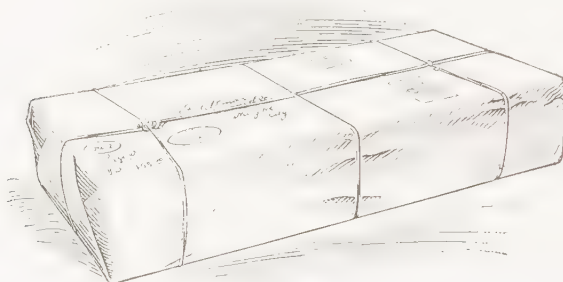


FIG. 3

grief because the contents were not properly distributed in the package. In contrast with this is the package shown in Fig. 3 which was amply prepared to meet the wear and tear of transportation.

**5. Marking the Shipment.**—For domestic shipments, little more is required than that the marking shall show clearly

full information as to the name of the party to whom the shipment is to be delivered (designated as the *consignee*), the name and address of the shipper (often designated as the *consignor*), and such other information as will expedite the delivery of the shipment. It is required that, wherever possible, the marking shall be done directly on the article or package by stencil, marking brush, or other durable method. The use of tags or labels is allowed only where other methods cannot be utilized, and such tags or labels must be of durable material attached in the most effective manner possible. Simple as are the requirements relative to marking domestic shipments, it will be shown elsewhere that altogether too much trouble arises from failure to do the work properly.

**6. Making Out the Bill of Lading.**—When a shipment is delivered to a transportation company, it must be accompanied by a document known as a *bill of lading*, which document serves two purposes: (1) It contains the shipper's instructions relative to handling the shipment, such as the routing, the description and weight of the shipment, and other essential information. (2) It contains the contract between the shipper and the transportation company as to the conditions under which the shipment is accepted for transportation. These conditions may be either written or printed. The bill of lading is signed by the shipper.

As the bill of lading contains the information that governs the handling of the shipment, too much care cannot be exercised in making out this document. For example, carelessness in describing the shipment may result in the collection of freight charges in excess of the correct ones, and an incomplete address may cause loss of the shipment. How instructions on the bill of lading are arrived at will be dealt with in another Section.

**7. Delivery to the Transportation Company.**—When the shipment has been packed and marked, the next step is to turn it over to the transportation company. This will generally be done in one of three ways: (1) By loading the property into a car or boat on the shipper's own tracks or docks, as in the case of the shipper who has a private sidetrack connected with

the railroads that serve him; (2) by delivery to the transportation company's trucks, as in the case of the express company which sends a truck to pick up shipments at the shipper's place of business; (3) by having the shipper's vehicle deliver the shipment to the transportation company at some place like the freight house of a railroad company.

One important difference between the first two and the last mentioned methods of delivery is that in the first two cases the liability of the transportation company for loss and damage generally begins when the freight is loaded, while in the last case it does not begin until the shipper's vehicle has reached the freight station and the freight has been unloaded into the freight house or car.

When delivery of the property to the transportation company has been completed, acknowledgment of the receipt of the property will be made by the signing of the bill of lading by an authorized representative of the carrier. The contract for the movement of the shipment is then complete, as it contains the signatures of both the shipper and the transportation company.

**8. Arrival at Destination.**—When a freight shipment that has gone forward by railroad arrives at its destination, the railroad notifies the consignee, usually by sending a postal card or a form called an arrival notice by United States mail. In specified cases, other methods of notification may be used by agreement, as in those instances where a telephone notice is accepted in place of a written notice. The arrival notice usually shows the details regarding the shipment that appears on the bill of lading, together with notice of the time when storage charges will begin to run if the goods are not removed.

Often for convenience in the railroad office the arrival notice is made out, by use of carbon paper, as one of four forms all containing practically the same information regarding the shipment. One of these, as Fig. 4, would be the freight bill, which would be receipted and given to the consignee if he pays any freight charges at time of delivery of the goods to him;



another would be the delivery record, which the consignee would sign as acknowledgment of receipt of the shipment, and the other would be the cashier's memorandum for use in his department.

It is important to bear in mind that, where an arrival notice is sent out by mail, the transportation company is relieved from responsibility for loss of the notice or delay in its delivery, and the consignee will have to pay storage, if the company's

Copy of FREIGHT BILL issued by				
..... Railroad				
At .....		Date .....		Freight Bill No. ....
Consignor .....		Point of Origin .....		
Consignee .....		Destination .....		
Waybilled from .....		Waybill No. ....	Date .....	
Connecting Line Reference .....				
Car Initials and No. } .....		Original Car Initials and No. } .....		
Route ..... Prepaid <input type="checkbox"/> Collect. <input type="checkbox"/>				
Number of Packages	Description of Articles	Weight	Rate and Authority	Freight and Charges
Received Payment .....			TOTAL	
Arrival Notice Received .....		Free Time Expired .....		
Place and Date Stored .....				
Number Days Stored .....		Delivery Accepted .....		Storage Charges .....

FIG. 4

records show that the notice was mailed at the time claimed and to the right address.

On receipt of the arrival notice, the consignee will arrange to remove the freight from the railroad property as promptly as possible, in order to avoid storage or demurrage charges. It is important to remember that the truckman sent to obtain the shipment is the agent of the consignee and, once he has receipted to the transportation company for the goods, the company is released from responsibility for any loss or damage that may occur to the shipment thereafter.

**9. Example of a Shipment.**—To make plain the application of what has been said regarding the preparation and shipment of goods, the steps in making a shipment of 500 pounds of bamboo poles 11 feet long will be described.

The regulations in the freight Classification provide that bamboo poles may be shipped in bundles, boxes or crates; and it will be assumed that conditions are such as to make it advisable to ship them in crates. The name and address of the consignor and of the consignee will be stenciled on each crate; then the bill of lading will be made out, giving the name and address of the consignee, the name of the consignor, weight and description of the shipment, and any other data that may be required. In this case it should be stated that the poles are less than 12 feet long, since, as explained later, this fact affects the freight rate.

The shipment is then delivered to the railroad, receipted for by the proper railroad official, and it may be assumed that it eventually arrives safely at the station of destination. There the consignee sends a truckman for it, who receipts to the railroad for the goods and delivers them to the consignee or wherever he orders. In most cases the freight charges must be paid before the railroad will relinquish possession of the shipment, but it is possible for the consignee by giving proper bond to obtain a few day's credit, which enables him to check freight bills before paying them.

**10. Computation of Transportation Charges.**—In connection with the handling of every shipment, it is necessary that the charges for moving the shipment be figured. This may be done either at the point of origin or of destination. The amount of the charges will not be affected by the fact that they are paid either before or after the transportation has been performed. In most cases, charges are paid after the transportation has been completed, unless the regulations of the transportation companies or the conditions of sale require prepayment of charges.

To figure charges on small shipments, such as the one men-

tioned in the preceding article, it generally is necessary that the freight Classification be consulted to find:

(1) The proper description of the shipment for the purpose of making out the bill of lading; (2) to find the class to which the shipment is assigned, as one essential feature of the Classification is that it shows the assignment of articles to different classes according to their similarities and differences from a transportation standpoint. Numbers or letters are used for designating classes, such as 1, 2, 3, or A, B, C, etc. In this case it will be found that bamboo poles, 12 feet *or less* in length take a first-class rate; and as the shipment consists of poles 11 feet long, it is assigned to first class.

Having determined the *class* to which the shipment is assigned, the rate for that class must next be found. To secure this information, reference must be made to a publication known as a Freight Tariff, in which rates are published in connection with the classes shown in the Classification in some cases, and in others in connection with specified articles. A tariff in which rates are published in connection with the classes shown in the Classification is known as a *Class Tariff*, and it is in this kind of a Tariff that the rate on bamboo poles will be found. If, then, the shipment is to move from Point A to Point B, and reference to the tariff shows that the first-class rate between these points is 50 cents per 100 pounds, the charges for 500 pounds will be \$2.50.

Whenever the transportation charges are paid, a receipted bill will be given; this bill will be important, not only in case a question is raised as to whether the charges have been paid, but as a very essential document in the filing of some kinds of claims.

The foregoing enumeration of steps in connection with the making of a shipment, includes those steps that are absolutely essential to the handling of every shipment moved by an established transportation line, but there are two other steps that are so frequently connected with the movement of even small shipments that they may be considered to be in the nature of routine matters and they will therefore be described

**11. Storage.**—When a shipment is not removed from the property of the transportation companies within a certain limited time after notice of its arrival has been given, a storage charge will be assessed. The limit of the “free time” during which goods will be held before storage is assessed is usually stated in the notice of arrival and is also published by the companies.

If the storage is in cars or boats, the charge will be known as a *demurrage* charge; while if it is not in vehicles, it will be designated as a *storage* charge.

As it is not the duty of transportation companies to act as warehousemen for undelivered property, it is optional with them whether they will furnish the storage facilities themselves or turn the shipments over to public warehousemen, and it is not uncommon to find that undelivered shipments are on hand in public warehouses.

**12. Claims.**—While most shipments are delivered without loss, damage, or overcharge, such is not always the case. When loss, damage, or overcharge does occur, and it is thought to be the fault of the transportation company, what is known as a *claim* must be filed. The papers in connection with claims, while varying with the individual cases, must generally include the bill of lading and the freight bill. Other papers, such as the invoice, may be required in the individual case. There are two essentials in connection with claims: (1) They must be filed in complete form; (2) usually they must be filed within a certain time, as specified on the bill of lading or elsewhere.

**13. Summary.**—While the matters that have been explained are only those necessary to be considered for the handling of shipments under the simplest traffic conditions, the knowledge required to carry them out successfully is not possessed by all shippers and receivers of freight. This lack of knowledge is common, even in regard to the handling of shipments moving short distances, and the lack of knowledge is greater in regard to shipments under more complicated conditions.

One of the many examples of the effect of this lack of knowledge is furnished by the shipment already described; for there is a difference in the rates on bamboo poles according to whether they are 12 feet or less in length, or exceeding 12 feet in length. Failure to state their length on the bill of lading might result in the collection of charges twice as high as the correct ones.

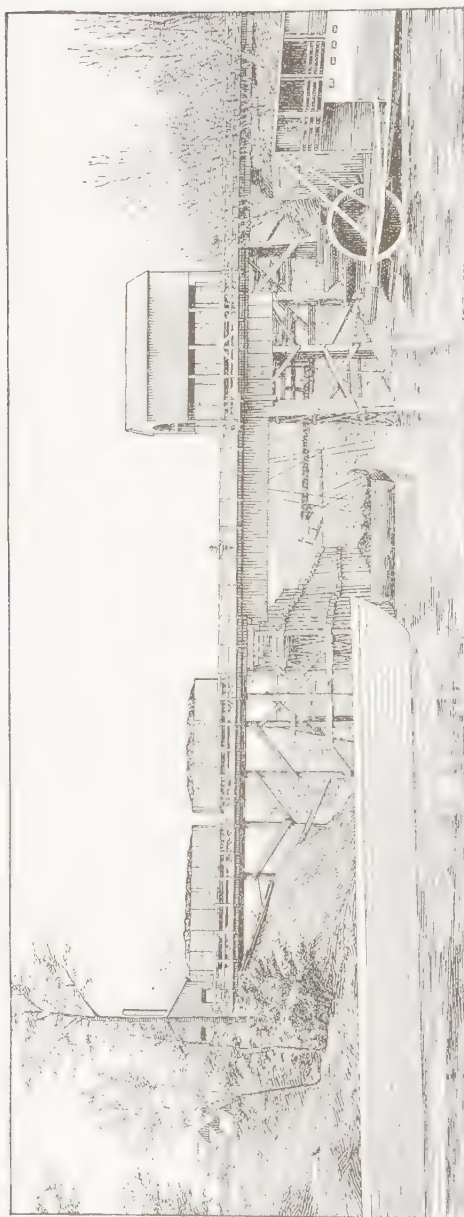
For satisfactory handling of shipping problems, it is necessary to be able to answer correctly the following questions: How is the shipment to be packed? How is it to be classified? How is it to be routed? Upon what basis should a claim be adjusted? In this and following Sections, these matters will be treated. The ability to answer these questions correctly will be worth many dollars to any man that has to ship or receive freight.

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## TRANSPORTATION AGENCIES

**14. Various Agencies.**—The principal transportation agencies, enumerated in the order of their importance, in domestic traffic are as follows: Rail, water, motor, animal, aircraft.

Of these agencies, only rail transportation is always found to be conducted by regularly established organizations, operating between a fixed list of points, and over routes not subject to frequent and material variations. This fact is principally explained by the nature of the roads over which rail transportation is conducted. A railroad can be constructed only by the expenditure of large amounts of money for every mile built and changes in route are expensive. Boats, motor trucks, animal-drawn vehicles, or aircraft, are, within certain limits, free to go where there may be need for them, even though such need may be temporary. For example, when wartime conditions made foreign traffic a most profitable service, boats were withdrawn from domestic service for the more profitable traffic overseas. When, later on, overseas traffic fell off, these boats again returned to domestic transportation, in some cases to the very routes that they had formerly abandoned, while in other cases new operations were undertaken.



There are many cases where two or more of the agencies just mentioned join in furnishing transportation for certain traffic. For example, it is common to find rail lines and water lines forming through transportation routes, as on traffic moving from New York to Buffalo by rail and by boat from Buffalo to points on the Great Lakes. Fig. 5 illustrates one of many examples where rail lines and water lines join in forming through transportation routes, coal being transferred from railroad cars to barges that are moved by steamers.

#### RAIL TRANSPORTATION

**15. Varieties of Transportation Service.**—Most railroads divide their services to the public between the freight

and the passenger departments. The relative importance of the two departments from a revenue standpoint is shown by the fact that if the important railroads of the country are taken as a whole, about two-thirds of their revenues are received from the freight department and one-third from the passenger department. In individual cases there will be found exceptions to this ratio, as in the case of certain roads that devote themselves almost exclusively to the movement of coal (freight), or other roads that cater almost entirely to summer-resort business (passenger). On some such roads, especially small ones where either the freight or the passenger business greatly predominates, a single organization may handle all the business.

It will be seen from what has been said that the freight department is by far the most important part of the railroad, although the general public is much more familiar with the limited express trains for passengers than it is with the many fast freight trains that are operated over the same tracks as the passenger trains.

In principle, the distinction between the method of transportation of freight and of passengers is that freight is usually transported on heavy trains moving at a low speed, and passenger traffic is handled on comparatively light trains moved at as high speed as conditions warrant. Under some circumstances, however, property is transported on passenger trains.

The classes of traffic transported by the passenger department include both express and mail, both being handled on cars attached to passenger trains, except where the volume of the traffic is sufficient to warrant the operation of solid trains carrying only mail or express. Such trains are operated between New York and Chicago and some of the other large cities.

**16. Express.**—The express service is particularly adapted to those commodities that require fast movement, and personal protection on account of value, or that consist of small packages liable to loss and damage when moved by freight. A feature of this service is that the express companies receive the shipment at the shipper's place of business and deliver it to the railroad at the point of origin, and they also deliver it to the



consignee's place of business at destination, trucks being operated for collecting and delivering. Though the railroads move the property between the points of origin and destination, they do so under contract with the express companies and have no direct contact with the public in the handling of this business.

Because of this special service, the express companies charge higher rates than are charged for the movement by freight. It should be understood, also, that though the express service is usually considered as a service for small shipments, a good many carload shipments are handled by express.

**17. Mail.**—As has already been explained, the transportation of mail is performed by the passenger department. And while this transportation is of vital importance to the business and personal life of every one, it is of interest to the student of the transportation of property because parcel post is now extensively used for the transportation of a large volume of traffic that formerly moved by express. In case of the mail, as with the express service, the railroads do the work under contract and the public has no direct dealings with them.

**18. Miscellaneous Freight Services.**—Certain classes of traffic require treatment distinct from that of routine freight. An example of such is found on the roads where large quantities of coal are moved from the mines and the coal is hauled in separate trains.

Of special importance are the facilities furnished for the movement of milk, fresh fruits, and vegetables; and the value of these services cannot be gauged by tonnage or revenues collected. For example, no one can place a dollars and cents value upon the highly dependable service that insures an ample supply of milk for our large cities. A feature of this class of service is that provision is made for the return of empty containers to the shippers, as in the case of milk cans returned to the farmers who shipped them.

**19.** Two distinctions between ordinary traffic and that requiring special service are: (1) The necessity of fast service in connection with such commodities as refrigerated products and

live stock; and (2) the use of special equipment for the transportation of the commodities mentioned and many others, such as oil, vinegar, etc., moved in tank cars. A factor in connection with the use of special equipment such as has just been referred to, is that much of it is not owned by the transportation companies, but by private owners. For example, only a few roads provide refrigerator cars, while the big meat packers and others use their own cars for such service as requires them.

It should be understood that fast service for freight is much slower than fast passenger service. Thus passenger trains go from New York to Chicago in 20 hours, while 96 hours is considered fast time for freight, even under most favorable conditions, and under ordinary conditions much longer time is required.

The movement of freight is slower than that of passengers for two reasons: (1) The locomotives used for freight are built for their ability to pull heavy loads rather than for speed, and (2) freight cars often are not kept continuously in motion between the point of origin and of destination as is the case with passenger cars. To illustrate, the passenger who buys a ticket from New York to Chicago will expect to be traveling continuously, or nearly so, until he gets to his destination, while the freight shipment may lose much time on the way because the car is set out in some yard for hours and even days. It should be said, however, that the railroads have been making strong efforts to reduce the unnecessary delays that were formerly so prevalent.

**20. Varieties of Freight Cars.**—In the transportation of freight, cars having a great variety of names are in use; but it will be found that practically all of them can be classified in three classes. These are: (1) Box cars; (2) open cars; (3) tank cars.

The box cars may be likened to boxes on wheels, with doors at the sides or ends. The refrigerator car is a box car modified to protect its contents from heat or cold. Also, the cars used for transporting livestock are box cars more or less open at the sides to afford ventilation.

The open cars include all cars that do not have roofs, except the tank cars, and may or may not have sides. A very prevalent type of open car, known as the gondola, much used for transporting coal, building materials, etc., is shown in Fig. 5. The platform car, which is really nothing more than a platform on wheels, without any sides or ends, is used for moving machinery, long timbers, etc., that need little protection and that cannot be handled in closed cars.

Tank cars are, in effect, flat cars with tanks of considerable capacity mounted on them for handling liquids, such as oil, vinegar, etc.

Freight cars vary in length from 34 to 60 feet, and in weight capacity from 20 to 120 tons, the average weight capacity being between 30 and 40 tons.

#### WATER TRANSPORTATION

21. While water transportation is necessarily limited to those points where navigation is possible, it is nevertheless growing in importance in the United States. It took the World War to bring about the realization of the part that waterways might be made to play in the distribution of commodities in this country. The field of usefulness of water transportation is not confined to those cases where delivery can be made entirely by water, but it includes the large field where rail lines and water lines can join in furnishing economical and satisfactory transportation services.

There was a time when it was thought that rail lines and water lines must treat each other as competitors and must under no conditions cooperate. In the pursuit of this policy the advantage lay largely with the railroads, as the boat lines could successfully handle business only to those points which they themselves served, if the rail lines refused to make through routes and joint rates, and to provide facilities for the interchange of traffic. Without going into the history of the effects of the antagonism of the rail lines to water lines, it may be said that the results, so far as water transportation was concerned, were that many boat lines were forced out of business, and the

railroads secured control of many boat lines, which they continued to operate, but with such increased rates as removed the advantages of the lower costs of water transportation. The condition when the United States entered the war was that a vast amount of tonnage was being handled by the water lines, but it was little in comparison with the capacity of the waterways as they then existed.

After the United States entered the war, the need of more transportation facilities became acute, and large numbers of boats of various kinds were built, not only for overseas and coastwise traffic, but for inland waters, such as the Erie Canal and the Mississippi River. The great falling off in business after the close of the war reduced largely the demand for transportation of all kinds, but the experience had shown the practicability and importance of the waterways for domestic transportation, and it is safe to forecast a continuing increase in such traffic in the future.

**22.** Unlike railroad transportation, water transportation often is conducted by temporary organizations or by individuals, who use their boats in whatever way seems profitable to them. Comparatively little capital is required to purchase and operate a boat between points where there is business, as the right of way is provided by nature, and in many cases it is not even essential that there shall be docks or warehouses for loading and unloading freight.

Not all water transportation, however, nor even the larger part, is conducted on this shifting basis, for there are old and established steamboat lines of many years' standing operating on inland waters and along the coast, not to mention the many long-established lines in overseas traffic.

**23.** From the standpoint of the kind of traffic carried, boats may be classified as follows: Those carrying only passengers; those carrying passengers and freight; those carrying freight only. Boats of the two classes first named are best known to the public, but boats of the last-mentioned class carry a very large part of the freight of the world. There are many regularly established lines carrying freight, but a very

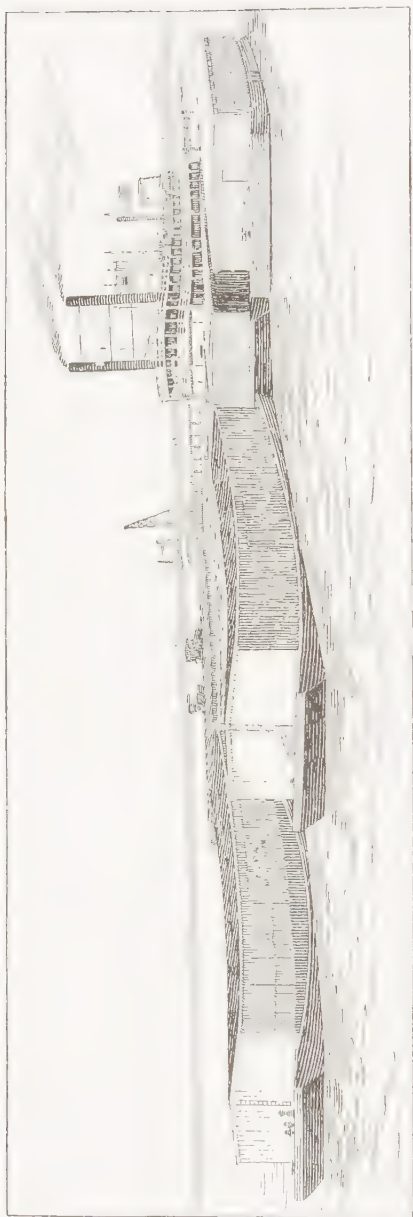


FIG. 6

considerable amount of freight is moved by boats that are not attached to any line but are engaged for only one or more trips as needed.

24. Another classification of boats is by their ability to get from place to place; in other words, according to their motive power. There are: (1) Boats equipped with engines capable of furnishing sufficient power for moving the boats from point to point as required; (2) boats equipped with sails or sails reinforced by engines of comparatively small power; (3) boats without any motive power of their own.

Boats of the first class perform all transportation for long distances, with the exception of a limited amount of traffic that is handled by those of the second class. Transportation in boats of the second class is necessarily limited to the movement of traffic where speed is not essential. Boats of the third



FIG. 7

class play a very important part in the movement of certain kinds of traffic on some rivers, on canals, and between points in harbors like that at New York. The extent to which these units without power may be used to advantage is shown in Fig. 6, which shows a tow consisting of barges carrying 9,000 tons of freight, equal to 300 carloads, that was moved from St. Louis to New Orleans by a single steamer. The same steamer carried 4,000 tons back upstream. A self-propelled barge built for service in the Warrior River district is shown in Fig. 7.

**25.** A point of difference between rail transportation and water transportation is that while it is very easy to add one or more cars to a train, when it is necessary or desirable to do so at the last moment, the capacities of most boats are so great that a small additional amount of freight remaining after

the boat is loaded cannot be handled to advantage, as it would not be enough to justify putting another boat in service.

While boat lines, because of their slower speed and other disadvantages, do not always handle all classes of traffic, they do so when they serve points not served by rail lines. Thus, boats are generally not used for transportation of mail where rail lines are available. However, in some cases boat lines may at times furnish better service than the rail lines do, as in the case of boats operating during the summer months.

In a great many cases, water rates are lower than rail rates, but in making comparisons, it is often necessary to take into consideration some disadvantages, such as longer time consumed in performing the service and the fact that insurance must be paid in addition to transportation charges.

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#### MOTOR TRANSPORTATION

26. When the motor truck first came into use, it was looked upon principally as a substitute and improvement on animal-drawn transportation. But experience has demonstrated that the motor truck is capable of competing with railroads for many classes of traffic. For what are usually considered as short hauls by the railroads, the truck has some special advantages, as it is able to take the traffic directly from point of origin to point of delivery, or from store door to store door, without any rehandling, and it also avoids the many opportunities for delay to which shipments by railroad are subject, particularly at the large terminals.

Aside from the work done by trucks owned by the shippers, and therefore directly under the shipper's control, motor-truck transportation is furnished by individuals and ever-changing organizations. Experience will no doubt result in the formation of more responsible organizations and greatly increase the amount of traffic handled by motor trucks.



### ANIMAL-DRAWN VEHICLES

27. For certain classes of local distribution, such as deliveries for retail stores, etc., where the haul is short and the stops are many, animal-drawn vehicles serve an important purpose. The boundaries of a city, however, are usually considered as representing the limits of economical use for such means of transportation, and even within those limits it often is found advisable to supplement the animal-drawn vehicles by forming centers of distribution to which goods are delivered by motor trucks and from there by horse-drawn vehicles.

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### AIR TRANSPORTATION

28. The use of aircraft for the transportation of passengers has become a recognized business in some places, but the application of this service to the transportation of property has not yet reached a point where it is to be considered in a general transportation scheme. The value of aircraft for the delivery of mail has been demonstrated, and in individual cases the delivering of other property is proving successful. Air transportation offers wonderful possibilities, particularly where peculiar conditions may favor such transportation, but much development work will have to be done before this means of transportation will be commonly available.

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### FREIGHT CLASSIFICATION

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#### CLASSIFICATION OF PROPERTY THE FOUNDATION OF CHARGES

29. **Details of Classification.**—The foundation for assessing charges for the transportation of property is the classification of that property according to its transportation characteristics; that is, so that articles having similar characteristics as to weight, bulk, value, etc., and that involve practically the same cost of handling, are placed in the same class. Such classification is used whether the transportation is performed by carriers that are subject to regulation, as in the

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Item	ARTICLES	RATINGS			Item	ARTICLES	RATINGS		
		Official	Southern	Western			Official	Southern	Western
1	<b>CARBON COMPOUNDS:</b>					<b>CARPET LINING—Continued:</b>			
2	<b>Bisulphide of Carbon (Disulphide of Carbon):</b>				16	<b>Felt or Paper—Continued:</b>			
	In glass packed in barrels or boxes.	1	1	1		<b>Other than indented or plain:</b>			
	In metal cans in barrels or boxes.	1	1	1		In bales, boxes, bundles, crates or rolls, L. C. L. ....	3	2	2
	L. C. L. ....	1	1	1		In packages named, C. L., min. wt. 24,000 lbs., subject to Rule 34.	5	5	3
	In metal cans in barrels or boxes.					<b>Indented or plain, and other than indented or plain, in packages named for L. C. L. shipments, mixed C. L., min. wt. 30,000 lbs., subject to Rule 34.</b>	*5	6	3
	C. L., min. wt. 30,000 lbs. ....	3	1	1		<b>Grass:</b>			
	In iron or steel barrels, L. C. L. ....	3	2	2		In bales or bundles, L. C. L. ....	3	2	2
	In iron or steel barrels, C. L., min. wt. 30,000 lbs. ....	4	2	1		In rolls, L. C. L. ....	3	2	3
	In tank cars, C. L., subject to Rule 35. ....	4	2	1		In boxes or crates, L. C. L. ....	3	3	3
3	<b>Carbon Tetrachloride:</b>					In packages named, C. L., min. wt. 24,000 lbs., subject to Rule 34.	5	5	4
	In glass packed in barrels or boxes.	*1	*1	1	18	<b>Carpet Lining, N.O.I.B.N.:</b>			
	In metal cans completely jacketed.	1	1	1		In bales or bundles, L. C. L. ....	3	2	1
	In metal cans in barrels or boxes.	2	1	2		In rolls, L. C. L. ....	3	2	1
	In iron or steel barrels, L. C. L. ....	R-2	1	3		In boxes or crates, L. C. L. ....	3	2	2
	In iron or steel barrels, C. L., min. wt. 30,000 lbs. ....	5	3	5	19	In packages named, C. L., min. wt. 24,000 lbs., subject to Rule 34.	5	2	3
	In tank cars, C. L., subject to Rule 35. ....	5	3	5		<b>Carpet Sweeper Case Parts, wooden, in the white:</b>			
4	<b>Carbon Removing Compounds, N.O.I.B.N.:</b>					In boxes, bundles or crates, L. C. L. Loose or in packages, C. L., min. wt. 30,000 lbs. ....	3	3	2
	In metal cans in boxes, L. C. L. ....	2	*2	2	20		5	6	A
	In metal cans in boxes, C. L., min. wt. 30,000 lbs. ....	*1	*2	4		<b>Carpet Weighting (cloth covered metal weights), in boxes. ....</b>	2	2	2
5	<b>Carboys, lead:</b>					<b>Carpet or Oilcloth Binding, metal, in barrels or boxes. ....</b>	3	2	2
	New, in wooden boxes. ....	1	2	1	21				
	Old, in wooden boxes. ....	R-2	1	4		<b>CARPETS OR CARPETING:</b>			
6	<b>Cards, Cotton or Wool, Hand, in barrels or boxes. ....</b>	1	1	2	21	<b>Cork:</b>			
7	<b>Carpet Beaters:</b>					In burlapped rolls, L. C. L. ....	2	1	1
8	<b>Rattan, reed or willow:</b>					In boxes or crates, L. C. L. ....	2	2	2
	In bampers. ....	D1	1	3	22	In packages named, C. L., min. wt. 30,000 lbs. ....	4	4	3
	In bags or bales. ....	D1	1	3		<b>Linoleum:</b>			
	In barrels, boxes or crates. ....	1	1	1	23	In burlapped rolls, L. C. L. ....	2	1	2
9	<b>Wire, with metal or wooden handles:</b>					In boxes or crates, L. C. L. ....	2	2	2
	In bags, bales or bundles. ....	1	1	2	24	In packages named, C. L., min. wt. 30,000 lbs. ....	4	4	3
	In barrels, boxes or crates. ....	1	1	2		<b>Oilcloth, Floor:</b>			
10	<b>CARPET LINING:</b>					In burlapped rolls, L. C. L. ....	2	1	2
11	<b>Cotton or Shoddy, quilted, see Note:</b>					In boxes or crates, L. C. L. ....	2	2	2
	In machine pressed bales, L.C.L. ....	3	3	3	25	In packages named, C. L., min. wt. 30,000 lbs. ....	4	4	3
	In machine pressed bales, C. L., min. wt. 30,000 lbs. ....	5	5	5		<b>Paper Felt, asphalted and painted or decorated:</b>			
12	<b>Note—The term "quilted" as used in this item means stitched between sheets of paper.</b>					In burlapped rolls, L. C. L. ....	2	1	2
13	<b>Felt or paper:</b>					In fibreboard or pulpboard tubes, see Note, L. C. L. ....	*2	2	*2
14	<b>Indented:</b>					In boxes or crates, L. C. L. ....	2	2	2
	In bales, boxes, bundles, crates or rolls, L. C. L. ....	3	5	3	26	In packages named, C. L., min. wt. 30,000 lbs. ....	4	4	3
	In packages named, C. L., min. wt. 30,000 lbs. ....	5	A	5		<b>Note—Walls of tubes must be not less than .120 inch in thickness, and ends of tubes securely capped or plugged.</b>			
15	<b>Plain:</b>								
	In bales, boxes, bundles or crates, L. C. L. ....	3	5	3	28				
	In rolls, L. C. L. ....	R-2	5	3					
	In packages named, C. L., min. wt. 30,000 lbs. ....	5	A	5					

See page 49 for explanation of abbreviations and characters.

FIG. 8

case of most of the railroads in this country, or those that are subject to no regulation, as in the case of boat lines engaged in foreign trade. In the case of the railroads and boats engaged in interstate commerce, the classification regulations have to be published and strictly adhered to, while in case of the boats in the foreign trade they need not be published, and they may be applied entirely according to the judgment and wishes of the carrier performing the transportation.

Classifications as now constructed have for their foundation the following elements: Whether the commodity is crude, rough, or finished; knocked down or set up; loose or in bulk; nested or in boxes, or otherwise packed; whether liquid or dry; whether of high or low market value; whether in carload or less-than-carload lots; the volume of the annual shipments carried; the kind of car required; whether of perishable or fragile nature; whether ice or heat must be furnished; the risk of handling either to the goods themselves or other property; the liability of waste or injury in transit. The amount of space occupied by the commodity in proportion to its weight is also one of the most important considerations. For example, it is very common for rates to be quoted, especially by water carriers, on the basis either of weight or of the space occupied, according to which method will be most favorable to the carriers in the amount of charges collected.

**30.** In classification of property for rate-making purposes, the articles are assigned to various classes designated by numbers and letters, as shown in Fig. 8, which shows a page from the Consolidated Freight Classification, the classes being indicated by numbers and letters in the columns headed "Ratings."

It should be noted that the class for carloads is different from that for less-than-carload lots of the same commodity and that in most cases the smallest weight that will be considered to be a carload is stated. To find the charge for freight on articles listed in the Classification, it is necessary first to note the class to which the article is assigned and then to refer to a tariff to find the rate applicable to that class. Such rates are called *class rates*.

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Publishing the Ratings Rules and Regulations of the Official Southern and Western Classifications

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## **RULE 7.**

The name of only one shipper, one consignee and one destination shall appear on a shipping order or bill of lading. This rule does not prohibit showing the name of the party to notify, when shipment is consigned "To Order" or the address of consignee when shipment is consigned to a point beyond the final carrier's point of delivery, but the issuing of bills of lading for shipment consigned "To Order" will not be permitted, unless the name of the person, firm or corporation to whose order the shipment is consigned, is plainly shown after the words "To Order." This rule does not prohibit showing the points at which shipments are to be stopped in transit for partial loading or unloading when such partial loading or unloading is specifically authorized by the carrier's tariffs applicable to such shipments. Issuing bills of lading for freight consigned to shipper's order at one point, notifying consignee at another point, will not be permitted, except where consignees are located at prepay stations or interior points, in which case freight must be consigned to an open station to be designated by shipper.

## **RULE 8.**

No charges of any description will be advanced to shippers, owners, consignees or agents thereof; nor to draymen or warehousemen for shippers, owners, consignees or agents thereof.

## **RULE 9.**

**Section 1.** All charges must be prepaid or guaranteed on any shipment which in the judgment of the Agent at point of shipment would not at forced sale realize the total amount of charges due at destination.

**Section 2.** Freight on which prepayment is required may, on approval of the General Freight Department of the carrier with which the freight originates, be forwarded on the guarantee of the shipper that all charges will be paid at destination. Full explanation to be made on way-bills.

**Section 3.** When charges due at destination are not paid on freight carried under guarantee, as provided in Sections 1 and 2 of this Rule, each carrier shall look to its immediate connection for reimbursement, the initial carrier being finally liable.

## **RULE 10.**

**Section 1. Applicable to the Official Classification:** Except as otherwise provided, when a number of different articles, for which carload ratings or rates are provided, are shipped at one time by one consignor to one consignee and destination, in a carload (see Rule 14), they will be charged at the carload rate applicable to the highest classed or rated article, and the carload minimum weight will be the highest provided for any of the articles in the carload.

**Section 2. Applicable to the Southern and Western Classifications:** Except as otherwise provided, when a number of different articles, for which carload ratings are provided, are shipped at one time by one consignor to one consignee and destination, in a carload (see Rule 14), they will be charged at the highest class carload rate applicable, and the carload minimum weight will be the highest provided for any of the articles in the carload. This section does not apply in connection with commodity rates except, under Southern Classification, on articles classified as "Fertilizer" rates or "Special Iron."

**Section 3.** Subject to the conditions of Section 1 or 2, when the aggregate charge upon the entire shipment is made lower by considering the articles as if they were divided into two or more separate carloads the shipment will be charged accordingly, as follows:

(A) Under Official Classification, the charges on each separate carload will be based upon the carload rate applicable to the highest classed or rated article therein and the highest carload minimum weight provided for any of the articles therein.

(B) Under Southern and Western Classifications, the charges on each separate carload will be based upon the carload rate applicable to the highest classed article therein and the highest carload minimum weight provided for any of the articles therein, but if one of the carloads is subject to a commodity rate the carload minimum weight applicable to that rate will apply on such carload.

**Section 4.** When the aggregate charge upon the entire shipment is less on basis of carload rate and minimum carload weight (actual or authorized estimated weight to be charged for if in excess of the minimum weight) for one or more of the articles and on basis of actual or authorized estimated weight at less than carload rate or rates for the other article or articles the shipment will be charged for accordingly.

Note. - Rule 10 will not apply upon articles for which carload ratings or rates are not provided nor upon shipments of Live Stock.

Rule 24 will not apply to mixed carload shipments when any article in the carload would be subject to Rule 24 if shipped in straight carloads.

Packages containing articles of more than one class will be rated in accordance with the terms of Rule 12, Section 3.

Specific carload mixtures will not prevent the application of Rule 10 to the same article or articles in mixed carloads with other article or articles not named in the mixture.

If a lower charge results under the application of Rule 10 than under provision for a specific mixture, Rule 10 will apply.

Name of only one shipper, etc., to be shown on shipping order or bill of lading.

Freight consigned "To Order."

Charges not advanced to shippers, etc.

Shipments of less value than charges.

Guarantee of charges.

Liability for guarantee.

Mixed carloads.

See page 49 for explanation of abbreviations and characters.

Besides the rates based on the classes to which the articles are assigned, there are also, in some instances, rates published that apply directly to specified commodities, without regard to the class to which the article is assigned in the Classification. Such rates are called *commodity* rates, and usually are granted only on carloads and for commodities that are handled in large quantities. It should be remembered that the fact that an article is listed in a certain class in the Classification does not imply that there is not also a commodity rate.

For domestic transportation, classification regulations are for the most part provided in the Consolidated Freight Classification and in the Official Express Classification. The use of the Consolidated Freight Classification is not confined to the lines that publish it, but is applied by many other lines, as in the case of many water lines that use it although not a party to it; because of its common use it will be described first, the Official Express Classification being treated in a later Section.

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#### THE CONSOLIDATED CLASSIFICATION

**31. Rules.**—An important part of the Consolidated Classification is that which carries what are known as the General Rules of the Classification. The term “general” is used to distinguish these rules from those that appear in connection with various individual items. Fig. 9 is a page of the General rules. There are two classes of these rules: (1) Those that deal with matters never included in the individual items in the Classification, and (2) those that deal with, and are superseded by, provisions in connection with individual items. For example, the General Rules deal with the matter of packing, but there are specific requirements in the Classification for the packing of certain kinds of freight, and the latter provisions govern.

The wide variety of matters covered by the various rules is illustrated by Fig. 10, which is a page of the index to rules, the completeness of which enables the user of the Classification to find readily information that he may want in connection with the rules.



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Racks to be furnished and installed by shipper and at his expense.....	10	30	1 a)	Not to be combined as one shipment.....	7	16	4
Rates—				Shipments (see also Articles and Freight)—			
Carload, application of.....	7	14		Carload—			
Commodity, remove the application of class rates.....	14	38		Delivered to more than one consignee, at request of owner, L. C. L. ratings to be applied on.....	8	23	4
Shown in tariffs governed by this Classification are subject to rules and charges lawfully established.....	14	37		Requiring two or more open cars on account of length.....	9	29	1
Ratings—				Less than carload—			
Any quantity ratings not to apply on freight requiring protection against heat or cold.....	10	31	3	Charges for, not to exceed charge for carload.....	7	15	1
Apply on any quantity when neither L. C. L. nor C. L. is shown.....	7	16	1	Minimum charge for single L. C. L. shipments.....	6	13	1
Carload—				Requiring more than one car on account of length, weight to be charged for.....	9	29	2
Application of.....	7	14		Mixed, classification applicable to.....	5	10	
Do not include expense of refrigeration.....	10	31	1	Single—			
Ratings on property shipped subject to bill of lading conditions.....	1	1	1. 2	Of L. C. L. freight, definition of.....	7	16	3
Provided for freight in carloads do not obligate carriers to furnish heated cars.....	10	31	2	Of one class, charges for.....	6	12	1
Territorial application of.....	50			Of two or more classes, charges for.....	6	12	2
To apply when carload shipments are delivered to more than one consignee.....	8	23	4	Two or more not to be combined as one shipment.....	7	16	4
To apply when packages do not comply with requirements and specifications for containers provided for.....	3	5	3	Tendered as a less than carload and found to be subject to C. L. rate.....	7	15	2
	19	41	1 b)				
	32	41	1 k)				
	34	41	1 c f)				
	35	41	1 g)				
	3	5	3				
	19	41	1 b)				
	32	41	1 k)				
	34	41	1 c f)				
	35	41	1 g)				

See page 49 for explanation of abbreviations and characters

FIG. 10

# UNITED STATES RAILROAD ADMINISTRATION

## Director General of Railroads

Only three Supplements to this Classification will be in effect at any time.

- |                                |                                  |   |
|--------------------------------|----------------------------------|---|
| ✦ Mich. P. U. C.-O. C. No. 45. | ✦ P. S. C.-1 N. Y.-O. C. No. 45. | I. C. C.-O. C. No. 45.  |
| ✦ Mich. P. U. C.-W. C. No. 2.  | ✦ P. S. C.-2 N. Y.-O. C. No. 45. | (Cancels I. C. C.-O. C. No. 44 and Supplements.)  |
| ✦ I.-P. U. C.-O. C. No. 45.    | ✦ M.-P. S. C.-O. C. No. 45.      | R. C. Fyfe's I. C. C. No. 14.   |
| ✦ I.-P. U. C.-W. C. No. 3.     | ✦ Ohio-O. C. No. 45.             | (Cancels R. C. Fyfe's I. C. C. No. 13 and Supplements.)   |
| ✦ P. S. C. Mo.-W. C. No. 5.    | ✦ P. S. C.-Pa.-O. C. No. 45.     | J. E. Crosland's I. C. C. No. 3.  |
| ✦ P. U. C. Colo.-W. C. No. 5.  | ✦ R. I.-P. U. C.-O. C. No. 45.   | (Cancels J. E. Crosland's I. C. C. No. 22 and Supplements.—Exceptions to Southern Classification will hereafter be found in J. E. Crosland's I. C. C. No. 4.) |
| ✦ P. S. C. Wyo.-W. C. No. 4.   | ✦ V.-P. S. C.-O. C. No. 45.      | C. R. C.-O. C. No. 45.  |
| ✦ P. U. C. Idaho-W. C. No. 4.  | ✦ N. H.-P. S. C.-O. C. No. 45.   | C. R. C.-W. C. No. 12.  |
| ✦ C. C. Okla.-W. C. No. 3.     | ✦ P. S. C.-Md.-O. C. No. 45.     | J. E. Crosland's C. R. C. No. 2.  |
| ✦ S. C. C. N. M.-W. C. No. 3.  | ✦ Me.-P. U. C.-O. C. No. 45.     | (Cancels C. R. C.-O. C. No. 44; R. C. Fyfe's C. R. C. No. 11, and J. E. Crosland's C. R. C. No. 8 and Supplements.)   |
| ✦ P. U. C. Utah-W. C. No. 2.   | ✦ P. S. C.-W. Va.-O. C. No. 45.  | S. E.-W. C. No. 2.  |
| ✦ P. S. C. N.-W. C. No. 1.     | ✦ I. R. C.-O. C. No. 45.         | (Cancels S. E. No. 1 and Supplements.)  |

(For State Cancellations, see page i.)

✦ Shown for account of carriers not under Federal Control.

## CONSOLIDATED FREIGHT CLASSIFICATION No. 1

(OFFICIAL CLASSIFICATION No. 45) (SOUTHERN CLASSIFICATION No. 44)  
(WESTERN CLASSIFICATION No. 56)

(Cancels Official Classification No. 44; Southern Classification No. 43, and Western Classification No. 55.)

Applies on Freight Traffic covered by tariffs issued subject to either the Official Classification, Southern Classification or Western Classification as such tariffs may provide.

Issued by R. N. Collyer, J. E. Crosland and R. C. Fyfe, Agents, and filed with the Interstate Commerce Commission and the Board of Railway Commissioners for Canada under Authority of Appointment Notices Numbers 2 and 9 of the Director General of Railroads, for Federal Controlled Carriers shown herein.

(Published for the Director General of Railroads and filed on ten days' notice with the Interstate Commerce Commission under Freight Rate Authority No. 17798 of the Director, Division of Traffic, United States Railroad Administration, dated November 19, 1919.)

This Classification is issued for Non-Federal Controlled Carriers, for Interstate traffic, on ten days' notice under Special Permission of the Interstate Commerce Commission No. 48433 of November 19, 1919, and for Intrastate traffic under authorities as noted on page i.

**ISSUED DECEMBER 10, 1919**

**EFFECTIVE DECEMBER 30, 1919**

Except on Intrastate traffic of Carriers not under Federal Control within the States of Illinois, Maine, Massachusetts, Vermont, and West Virginia, see page i.

Issued and filed with the following Commissions by R. N. Collyer, J. E. Crosland and R. C. Fyfe, Agents, only for the individual carriers named who are not under Federal Control:

Interstate Commerce Commission.  
Board of Railway Commissioners for Canada.  
United States Shipping Board.  
Pennsylvania Public Service Commission.  
Rhode Island Public Utilities Commission.  
West Virginia Public Service Commission.  
New York Public Service Commission, First and Second Districts.  
Ohio Public Utilities Commission.  
Indiana Public Service Commission.  
Massachusetts Public Service Commission.  
Vermont Public Service Commission.  
New Hampshire Public Service Commission.

Michigan Public Utilities Commission.  
Maryland Public Service Commission.  
Maine Public Utilities Commission.  
Illinois Public Utilities Commission.  
Public Service Commission of Missouri.  
Public Utilities Commission of Colorado.  
Public Service Commission of Wyoming.  
Public Utilities Commission of Idaho.  
Corporation Commission of Oklahoma.  
State Corporation Commission of New Mexico.  
Public Utilities Commission of Utah.  
Public Service Commission of Nevada.

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The Dinkley Printing Company, Chicago

FIG. 11



# CONSOLIDATED FREIGHT CLASSIFICATION NUMBER 1

Publishing the Ratings, Rules and Regulations of the Official, Southern and Western Classifications

lv

## INDEX TO ARTICLES—Continued.

	Page	Item		Page	Item		Page	Item
Carbonic Accumulators.....			Carriage Forgings.....	415	19,20	Cars, Gondola.....	340	21
Distillers, Purifiers,			" " " ".....	416	1	" " " " mixed C.L.....	402	8
Regenerators or Re-			" Irons.....	415	7	" " " " " ".....	335	16
ceivers.....	264	9,29	" Irons, N.O.I.B.N.....	415	19,20	" " " " mixed C.L.....	267	19
" Acid Gas.....	200	14	" " " ".....	416	1	" " " " " ".....	338	19-21
" Compressors.....	264	13,29	" Seats.....	417	30-32	" " " " " ".....	333	23
" Condensers, Equalizers			" " " ".....	418	1-3	" " " " " ".....	338	24
or Exchangers.....	264	14,29	" Shifting Rails.....	415	8	" " " " " ".....	338	24
" Headers.....	264	25,29	" Stampings.....	415	19,20	" " " " " ".....	338	24
" Pumps.....	264	13,29	" " " ".....	416	1	" " " " " ".....	338	24
Carbons, Arc Lamp or			" Steps.....	415	11-15	" " " " " ".....	338	24
Battery.....	115	29	" Top Joints.....	415	8	" " " " " ".....	338	24
Carborundum.....	50	2-5	" Valances.....	419	11	" " " " " ".....	338	24
" Cloth.....	50	6	Carriages, Baby.....	402	12-14	" " " " " ".....	338	24
" Cloth and Paper com-			" " mixed C.L.....	402	22	" " " " " ".....	338	24
bined.....	50	6	" Burial Case or Casket.....	109	21	" " " " " ".....	338	24
" Paper.....	50	7	" Cannon, Dummy.....	113	11	" " " " " ".....	338	24
" Refuse.....	50	5	" Doll.....	402	12-14	" " " " " ".....	338	24
" Wheel Grindings or			" " mixed C.L.....	402	22	" " " " " ".....	338	24
Stubs.....	50	5	" Gun.....	248	33-37	" " " " " ".....	338	24
Carborundum Wheels.....	428	17	" Hose, Fire.....	166	8	" " " " " ".....	338	24
Carboy Stoppers, Clay.....	370	5	" Tension.....	269	1	" " " " " ".....	338	24
Carboy Tilting Frames.....	390	2-4	" " mixed C.L.....	270	7	" " " " " ".....	338	24
Carboys, Glass, N.O.I.B.N.....	203	4-10	" Vault.....	400	5	" " " " " ".....	338	24
" Glass, old.....	204	5	Carrier Buckets, Feed or Litter.....	118	4,5	" " " " " ".....	338	24
" Lead.....	116	5	" " Cars, Feed or Litter.....	118	4,5	" " " " " ".....	338	24
Carburetors.....	256	2	Carriers, Bakery Goods.....	117	12-14	" " " " " ".....	338	24
Cardamom Seed.....	356	3	" Banana, N.O.I.B.N.....	117	15-17	" " " " " ".....	338	24
Card Board.....	307	15	" Bottle.....	117	18-24	" " " " " ".....	338	24
" Clothing Machine			" Bottle, old, mixed C.L.....	76	20	" " " " " ".....	338	24
Parts.....	273	18	" " " " " ".....	204	4	" " " " " ".....	338	24
" Flats.....	273	19	" Bundle, Binder, Har-			" " " " " ".....	338	24
" Racks, Time Record-			vester or Reaper.....	61	5	" " " " " ".....	338	24
ing Clock.....	337	17	" Butter.....	117	25	" " " " " ".....	338	24
" Strippings.....	137	24	" Egg, fibreboard, pulp-			" " " " " ".....	338	24
Carded Cotton.....	137	13	board or strawboard.....	148	28	" " " " " ".....	338	24
Cards, Cotton.....	116	6	" Egg, wooden.....	148	29,30	" " " " " ".....	338	24
" Curry.....	140	18	" Fish Shipping Refrig-			" " " " " ".....	338	24
" Index.....	309	23	erator.....	117	26	" " " " " ".....	338	24
" Photograph Mounting.....	309	16	" Fuel Wood.....	117	27	" " " " " ".....	338	24
" Playing.....	309	17	" Hay.....	58	7	" " " " " ".....	338	24
" Postal, Government			" Luff Vans.....	117	28	" " " " " ".....	338	24
Stamped.....	310	8	" Oyster Refrigerator.....	117	29	" " " " " ".....	338	24
" Sunday School.....	122	2	" Stone, and Pullers.....			" " " " " ".....	338	24
" Wool.....	116	6	" Combined.....	375	15	" " " " " ".....	338	24
" N.O.I.B.N., Paper.....	309	18-22	" Timber.....	393	27,30	" " " " " ".....	338	24
Carettes.....	406	10	Carriers' Live Stock Con-			" " " " " ".....	338	24
Carlines.....	341	15-17	tract.....	47-48		" " " " " ".....	338	24
Carauaba Wax.....	424	15	Carrots.....	400	10,11	" " " " " ".....	338	24
Carousals.....	282	6-8	Cars, Baggage.....	340	5	" " " " " ".....	338	24
Carpet Beaters.....	116	7	" Box.....	340	15	" " " " " ".....	338	24
" Binding, metal.....	116	22	" Caboose.....	340	16,17	" " " " " ".....	338	24
" Lining, Cotton.....	116	11	" Chair.....	340	6	" " " " " ".....	338	24
" Lining, Felt.....	116	13	" Cinder.....	340	29	" " " " " ".....	338	24
" Lining, Grass.....	116	18	" " " mixed C.L.....	267	19	" " " " " ".....	338	24
" Lining, Paper.....	116	13	" Coach.....	340	7	" " " " " ".....	338	24
" Lining, Shoddy.....	116	11	" Coal.....	340	18	" " " " " ".....	338	24
" Lining, N.O.I.B.N.....	116	19	" Coke.....	340	18	" " " " " ".....	338	24
" Mill Flyings.....	380	25	" Dining.....	340	8	" " " " " ".....	338	24
" Mill Sweepings.....	380	25	" Dry Kln.....	146	34-39	" " " " " ".....	338	24
" Remnants.....	117	10	" " " ".....	147	1	" " " " " ".....	338	24
" Stretchers.....	378	12	" Dump.....	340	19	" " " " " ".....	338	24
" Sweeper Case Parts.....	116	20	" " " mixed C.L.....	267	19	" " " " " ".....	338	24
" Sweepers.....	380	22	" " " with Grading and			" " " " " ".....	338	24
" " and Vacuum			Roadmaking Imple-			" " " " " ".....	338	24
Cleaners Combined.....	380	23	ments.....	207	21	" " " " " ".....	338	24
" Weighing.....	116	21	" Electric Motor.....	340	28	" " " " " ".....	338	24
Carpets or Carpeting, Cork			" Elevator.....	156	16	" " " " " ".....	338	24
" " " Floor Oilcloth.....	116	26	" " mixed C.L.....	261	7	" " " " " ".....	338	24
" " " Linoleum.....	116	25	" Express.....	340	9	" " " " " ".....	338	24
" " " Paper Felt.....	116	27,28	" Feed Carrier.....	118	4,5	" " " " " ".....	338	24
" " " Wood.....	117	9	" Flat.....	340	20	" " " " " ".....	338	24
" " " N.O.I.B.N.....	117	10	" Freight, N.O.I.B.N.....	340	27	" " " " " ".....	338	24
" " " " " ".....	117	10	" Furnace charging.....	338	16	" " " " " ".....	338	24
Carragen Moss.....	355	16	" " " mixed			" " " " " ".....	338	24
Carriage Bodies, baby or go-			C.L.....	267	19	" " " " " ".....	338	24
cart.....	414	26	" Gasoline motor.....	338	17	" " " " " ".....	338	24
" Castings.....	415	19,20	" " " ".....	340	28	" " " " " ".....	338	24
" " " ".....	416	1	" " " ".....	340	28	" " " " " ".....	338	24
" Dashes.....	416	2	" " " ".....	340	28	" " " " " ".....	338	24
" Fenders.....	416	10	" " " ".....	340	28	" " " " " ".....	338	24

See page 49 for explanation of abbreviations and characters.

**32. Title Page.**—The title page of any traffic publication contains much essential information in connection with that publication, as is shown in Fig. 11, which is a reproduction of the title page of the Consolidated Freight Classification. The requirements as to the information that must appear on the title page of a traffic publication are specified by the rules of the Interstate Commerce Commission, and attention is called to two essential points of information, which appear on the title page, Fig. 11. One is the I. C. C. number that appears in the upper right-hand corner; without this number this Classification could not be used in connection with traffic subject to the jurisdiction of the Interstate Commerce Commission. The other especially important matter is the effective date. The date shown in Fig. 11 indicates that the Classification from which Fig. 11 is taken could not have been used at any time before Dec. 30, 1919.

**33. Indexes.**—In order that any publication may be used to advantage, there must be a complete index showing where the information contained is to be found, and this necessity is met in the Classification by the Index of Articles, of which Fig. 12 is a page. In this index are shown all the articles for which provision is made in the Classification. A study of this index will show that, in most cases it is possible to locate an article either through the noun or the adjective description. Thus, such an item as *box car* may be located either by referring to *cars* or *box* in alphabetical order in the index.

While it is a comparatively easy matter to locate such items as have just been referred to, there are many cases where it is not such a simple matter. For example, the article to be shipped may be known by some trade name that does not describe the article from the classification standpoint. Thus, the word *Victrola* does not appear in the index, and one must bear in mind that a *Victrola* is a *talking machine* in the language of the Classification.

In some cases a careful study of the article to be shipped will have to be made with a view of determining from such factors

as the use, or material from which the article is made, just what description in the Classification may be applicable to it.

A study of the index will show that not only page numbers are given but item numbers on the page. For example, suppose that there is a shipment of *Carpet Lining, Felt*; a study of Fig. 12, which is a page from the index, shows that this commodity appears on page 116, item 13; which page is shown in Fig. 8.

**34. Abbreviations and Terms.**—Before undertaking an analysis of Fig. 8, which is a typical page from the Classification, attention is called to Fig. 13 in which is given an explanation of abbreviations and characters that appear throughout the Classification.

The classes such as  $1\frac{1}{4}$  times 1st Class, D1, etc., listed in Fig. 13, are known as *multiple* classes, the first-class rate being used as a basis. For example, if provision is made for a certain article to take a D1 rate, when the first-class rate is 50 cents, the D1 rate would be \$1.00. These multiple classes apply to articles that are very light in comparison to the space occupied, or those that are of more value than the ordinary articles, or are a combination of both.

**35.** Under the heading of Abbreviations, Fig. 13, attention is called to the abbreviations, *L. C. L.*, *C. L.*, and *Min. wt.*, and their meanings, as they are closely related to one another. One entirely uninformed on traffic matters might, with a certain degree of accuracy, say that less than carload means a small quantity of freight, while a carload is a sufficient amount to fill a car; but these terms have a more specific meaning in freight classification, and this meaning should be understood.

As the first step in this understanding, the term *carload* must be looked at from two standpoints:

1. From the physical standpoint; that is, from the amount that will actually go in the car, either from the *weight* or the *space* occupied. In other words, if a car has a capacity of 60,000 pounds and that amount is loaded, it is a carload from the weight standpoint. Again, if a certain lot of furniture occupies all the space in a car, it is a carload from the space standpoint.

### Publishing the Ratings, Rules and Regulations of the Official, Southern and Western Classifications

## EXPLANATION OF ABBREVIATIONS, CHARACTERS AND SYMBOLS.

### Characters Appearing in Territorial Rating Columns.

1.....	means First Class.	D1.....	means Double 1st Class.
2.....	" Second Class.	2½t1...	" Two and one-half times 1st Class.
R25...	" Rule 25 Class.	3t1...	" Three times 1st Class.
3.....	" Third Class.	3½t1..	" Three and one-half times 1st Class.
R26...	" Rule 26 Class.	4t1....	" Four times 1st Class.
R28...	" Rule 28 Class.	A.....	" Class A.
4.....	" Fourth Class.	B.....	" Class B.
5.....	" Fifth Class.	C.....	" Class C.
6.....	" Sixth Class.	D.....	" Class D.
1¼.....	" One and one-fourth times 1st Class.	E.....	" Class E.
1½.....	" One and one-half times 1st Class.		

Abbreviations Appearing in the Descriptions of Articles.

L.C.L.....	means Less than Carload.	N.O.I.B.N. means	Not otherwise indexed by name.
C.L.....	" Carload.	S.....	" Section.
Lbs.....	" Pounds.	S.U.....	" Set up.
Min. wt....	" Minimum Weight.	K.D.....	" Knocked down.

Symbols or Abbreviations Used with Descriptions of Articles or in Territorial Rating Columns.

▲	Denotes Reductions.
●	" Increases.
★	" Additions.
▲	" Reduction in Official Classification rule or minimum weight.
●	" Advance in Official Classification rule or minimum weight.
◆	" Reduction in Southern Classification rule or minimum weight.
●	" Advance in Southern Classification rule or minimum weight.
◆	" Reduction in Western Classification rule or minimum weight.
●	" Advance in Western Classification rule or minimum weight.
☐	" Carload rating eliminated from Official Classification.
☐	" Carload rating eliminated from Southern Classification.
☐	" Item revised to make actual weight applicable in Official Classification.
◆	" Subject to rates and regulations of individual carriers.

\$6 or Fertz. . . . appearing in Southern rating columns means Fertilizer rates or 6th Class in absence of Fertilizer rates.

#6 or Sp. Iron...	"	"	"	"	"	"	"Special Iron" rates or 6th Class in absence of "Special Iron" rates.
120% Fertz.C.L.	"	"	"	"	"	"	120% of Fertilizer carload rates.
⊗.....	"	"	"	"	"	"	the rating applies on any quantity.
◇.....	"	"	"	"	"	"	that Southern Classification ratings will not apply on Cocaine, Morphine nor Opium, which will not be accepted.

In the descriptions of articles which follow, "and" is used to couple the descriptive terms between which it is used; "or" is used where the description includes either or both of the descriptive terms between which it is used; and the descriptive terms appearing within parentheses constitute another description of the identical article immediately preceding the parentheses.

Where any part of the description of an article is found set away from the left margin in a position subordinate to the text preceding it, the description is to be read with its context and particularly with the preceding heading or headings; the effect of its position upon the meaning of a description should be carefully observed.

FIG. 13

2. From the standpoint of computing freight charges, the lowest weight which will be recognized as a carload in connection with a certain commodity is published as a *minimum carload weight*. To put the matter in another way, a minimum carload weight is the lowest weight on which one can secure the benefit of the carload rate (which is lower than L. C. L. rate). As an illustration, in Fig. 8 the minimum weight on Oilcloth, Floor, is shown as 30,000 pounds, which means that carload rates will not be assessed on less than that number of pounds.

There are two things in connection with minimum weights which must be understood:

(a) Where the actual weight of a shipment is greater than the minimum weight, charges must be paid on the basis of the actual weight of the shipment, at the carload rates. For example, if the minimum weight for a certain commodity is shown in the Classification as 36,000 pounds, while the actual weight of a specified shipment of that commodity placed in the car is 40,000 pounds, charges will have to be paid on the basis of the latter amount, at the carload rate.

(b) Where the actual weight of a shipment is *less* than the minimum weight, the shipper has the option of billing the shipment on the basis of the actual weight at the L. C. L. rate or he can bill it as though it actually weighed as much as the minimum weight. For example, if the actual weight of the shipment is 20,000 pounds and the minimum weight 24,000 pounds, it might pay the shipper to bill the 20,000 pounds as 24,000 pounds at the carload rate, rather than on the basis of actual weight and less than carload rate. In such cases, the weight would appear on the bill of lading thus:

20,000 pounds  
as  
24,000 pounds

To be sure of getting the lowest rate, it is advisable to figure the charges both ways, and use the method producing the lowest charges.

**36.** The abbreviation *N. O. I. B. N.*, shown in Fig. 13, applies to those articles that are not otherwise provided for under a specified heading. In the case of *Carpet Lining N. O. I. B. N.*, referred to in Fig. 8, it will be noted that classes are provided for various kinds of carpet lining in items 11 to 18, inclusive, but if a shipment of this commodity not specifically described, is offered for transportation it will take the *N. O. I. B. N.* rating given in item 19.

Other pages of the Classification furnish additional information similar to that which has been explained, except that many commodities are governed by more complicated classification provisions than are required for the articles enumerated in Fig. 8. For example, cigars and cigarettes are shipped in packages constructed according to special regulations, and live stock is of such a nature that it must be handled in a very special manner including expedited train service.

**37. Determining the Classification Governing.**—The Consolidated Classification in certain senses is a single publication, while in another sense it is three publications. A study of Fig. 8 will show that, while the general rules, packing requirements, and descriptions are the same throughout the country, there are different classes provided according to whether the traffic is subject to the provisions, of the Official, the Western, or the Southern Classification, which names appear at the head of the three columns under "Ratings."

While it would not be profitable to undertake a detailed study of the territories in which the three classifications generally govern, it may be said that Official Territory may be roughly described as that part of the country east of the Mississippi River and north of the Ohio and Potomac Rivers; Southern Classification Territory, the territory east of the Mississippi and south of the Ohio and Potomac Rivers; while the Western Classification Territory includes the rest of the United States. These territories cannot be considered as representing hard and fixed boundaries, because a classification applies according to the provisions of the tariffs that govern the



*traffic*, which provision is carried in a clause appearing on the title page; the following is an example of such a clause:

Governed, except as otherwise provided in Tariff and as amended by the Western Classification No. 56 (Consolidated Freight Classification No. 1, I. C. C. No. 14 of Agent R. C. Fyfe, C. R. C. No. 217 of Agent F. W. Gomph), supplements thereto and reissues thereof, and by exceptions to said classification, Pacific Freight Tariff Bureau Exception Sheet No. 1-G (I. C. C. No. 443, C. R. C. No. 221, of Agent F. W. Gomph), supplements thereto and reissues thereof. (See Rule 4.)

A study of the freight Tariffs of the country will show that many of them carry provisions which make a specified Classification applicable outside the boundaries that have been indicated for that Classification. For example, there are Tariffs issued which apply on traffic moving from New York to Minneapolis, which show on the title page that they are governed by the Official Classification. Therefore, in such case the Official Classification governs outside the previously described boundaries of the Official Classification Territory.

It is very essential that one should definitely determine what Classification governs his shipment, and also exercise great care to see that he uses the right column in the Classification in ascertaining the class applicable. For example, it will be noted in Fig. 8 that carpet lining N. O. I. B. N., in rolls, *L. C. L.*, takes third class under the Official Classification, second class under the Southern Classification, and first class under the Western Classification. Therefore, a carrier who made a mistake and rated a shipment on the basis of the Western Classification, when it should have been rated under the Official Classification, would collect a considerable amount of unnecessary charges if the shipper or the consignee did not detect the error.

**38. The Work of Classification Committees.**—Three questions which naturally come into mind in a study of the Consolidated Classification are: Where does the Classification come from? Who makes the provisions that it contains? What factors do they take into consideration?

The Consolidated Classification is prepared and issued by the Consolidated Classification Committee, Room 1830, Trans-





portation Building, Chicago, Ill. The work of this committee is nation-wide and is supplemented by three regional committees—the Official, the Western, and the Southern Classification committees. The chairmen of these regional committees constitute the Consolidated Classification Committee. The regional committees take care of such matters as affect only their respective territories, and they work together on such matters as affect more than one territory. While it is generally appreciated that it is desirable that there shall be uniformity of classification provisions, so far as is possible, the time will probably never come when all commodities can be assigned to the same class under all three classifications; however, it is the endeavor of the regional committees to come as near as is practicable to reaching this desired goal. A study of the Classification will show that, so far as rules, packing requirements, and descriptions are concerned, there is now practical uniformity.

While the Classification committees are employed by the carriers, they are in reality a body of experts, who act to a considerable extent as referees between shippers and carriers in the adjustment of classification matters. Their work varies all the way from very minor investigations up to those which require the securing of extensive data from various sources.

**39.** Much of the work of the Classification Committees is such that it cannot be subjected to the limitations of forms, but there are two forms that are in frequent use in connection with their work. Fig. 14 is a form that must be filled out when it is desired to have provision made in the Classification for something that has not previously been provided for. This form is not difficult to understand, but accuracy in furnishing the data called for is important.

In addition to the factors referred to on the form, Fig. 14, *comparison* plays a very important part in the classification of different articles. Thus, if a shipper asks that an article be given a third-class rating, he should consider how it compares with other articles taking the same class. The Classification Committee has always to bear in mind that, when it

## OFFICIAL CLASSIFICATION COMMITTEE

143 LIBERTY STREET, NEW YORK CITY

## APPLICATION FOR CHANGE IN CLASSIFICATION

Article:

Date \_\_\_\_\_ 192 \_\_\_\_\_

Name of: \_\_\_\_\_

Full Description of \_\_\_\_\_

Made of: \_\_\_\_\_

Uses: \_\_\_\_\_

SEND ILLUSTRATED  
CUT OF THE ARTICLE,  
PHOTOGRAPH OF OR  
CATALOGUE WHEN  
PRACTICABLE TO DO  
SO

## How Packed or Prepared for Shipment:

(State whether in bags, barrels, boxes, bundles, crates or other package, or in pieces or in bulk.)

When Shipped L. C. L.:

When Shipped C. L.:

If Knocked Down, to what extent:

If Nested, to what extent:

DIMENSIONS OF PACK- AGE OR PIECES, IN INCHES			WEIGHT AS PACK- ED FOR SHIPMENT		VALUE Per Lb.
LENGTH	WIDTH	HEIGHT	Per Pkg. or Piece Lbs.	Per Cubic Ft. (See Foot Note) Lbs.	

ACTUAL WEIGHT THAT CAN BE LOADED IN STANDARD  
CARS 40 FEET IN LENGTH, 8 FEET 6 INCHES WIDE  
AND 8 FEET HIGH (INSIDE MEASUREMENT):

## Present Classification:

Description: \_\_\_\_\_

Ratings: \_\_\_\_\_ Class, L. C. L.: \_\_\_\_\_ Class, C. L.: \_\_\_\_\_ Min. C. L. Weight

## Classification Desired:

Description: \_\_\_\_\_

Ratings: \_\_\_\_\_ Class, L. C. L.: \_\_\_\_\_ Class, C. L.: \_\_\_\_\_ Min. C. L. Weight

IS THE ARTICLE SHIPPED IN STRAIGHT CARLOADS \_\_\_\_\_ IF SO, HOW MANY CARS PER ANNUM \_\_\_\_\_

IF SHIPPED IN MIXED CARLOADS WITH OTHER ARTICLES, MENTION THE OTHER ARTICLES \_\_\_\_\_

WHERE PRODUCED \_\_\_\_\_

REASON WHY THE CHANGE OR ADDITION SHOULD BE MADE SHOULD BE FULLY STATED  
(If space below is not sufficient, full explanation should be made in letter accompanying the application.)

Remarks: \_\_\_\_\_

APPLICANT'S ADDRESS

APPLICANT'S SIGNATURE

## NOTICE

Requests for changes in the Official Classification must be filed in writing with this Committee.

Note—To ascertain the "weight per cubic foot" multiply together the three extreme dimensions of the article as packed for shipment, and where the result is in cubic inches, divide by 1728 to reduce to cubic feet, then divide the weight by the number of cubic feet thus ascertained.

FIG. 15

(Hotel Ansley, Atlanta, Ga., April 13, 1921  
Hearings Room 408, 143 Liberty St., New York City, April 18, 1921  
1830 Transportation Bldg., Chicago, Ill., April 25, 1921)

CONSOLIDATED FREIGHT CLASSIFICATION No. 2.					CLASSIFICATION SUGGESTED.						
HEARINGS AT CHICAGO	SUBJECT No.	PAGE	ITEM	ARTICLES	RATINGS			ARTICLES	RATINGS		
					Official	Southern	Western		Official	Southern	Western
				<b>EXTRACTS:</b> Orange Orange, Quercitron or Redwood Dry: In barrels or boxes, L. C. L. .... In packages named, C. L., min. wt. 30,000 lbs. .... Liquid or paste: In barrels, L. C. L. .... In barrels, C. L., min. wt. 30,000 lbs. ....	3	5	5	<b>EXTRACTS:</b> * Hypric, Redwood or Quercitron Dry: In barrels or boxes, L. C. L. .... In packages named, C. L., min. wt. 30,000 lbs. .... Liquid or paste: In barrels, L. C. L. .... In barrels, C. L., min. wt. 30,000 lbs. ....	4	5	5
				<b>Cutch, Catechu, Gambier Japonica or Terra Japonica:</b> Liquid Extract: In bulk in barrels, L. C. L. .... In bulk in barrels, C. L., min. wt. 30,000 lbs. .... Solid: In bags, bales, boxes or mats, L. C. L. .... In packages named, C. L., min. wt. 30,000 lbs. ....	2	3	5	<b>*Cutch, Catechu, Gambier, Japonica or Terra Japonica:</b> Liquid Extract: In bulk in barrels, L. C. L. .... In bulk in barrels, C. L., min. wt. 30,000 lbs. .... Solid: In bags, bales, boxes or mats, L. C. L. .... In packages named, C. L., min. wt. 30,000 lbs. ....	4	5	5
4.20 p. m.	49	1217	38	<b>Hangers:</b> Garment, N.O.I.B.N. Wire, in barrels or boxes, .....	2	2	2	<b>Hangers:</b> * Garment, N.O.I.B.N. Wire: In barrels or boxes, L. C. L. .... In packages named, C. L., min. wt. 21,000 lbs., subject to Rule 34 .....	2	2	2
4.25 p. m.	50			<b>PETROLEUM OR PETROLEUM PRODUCTS, INCLUDING COMPOUNDED OILS OR GREASES HAVING A PETROLEUM BASE, see Notes 1, 2, 3, 4, 5 and 6:</b> Note 4—Gas, Petroleum, Liquefied, vapor tension at 100° Fahrenheit, not exceeding 25 lbs. per square inch, must be shipped in metal drums or barrels, or in tank cars, exactly constructed and approved for this service by the Master Car Builders' Association. *Liquefied Petroleum Gas, "near ketone" at 100° Fahrenheit, exceeding 25 lbs. per square inch, is classified under descriptions for Gases, naphtha. Gas, Liquefied, vapor tension at 100° F., not exceeding 25 lbs. per square inch, see Note 6				<b>*PETROLEUM OR PETROLEUM PRODUCTS, INCLUDING COMPOUNDED OILS OR GREASES HAVING A PETROLEUM BASE, see Notes 1, 2, 3, 4, 5 and 6:</b> Note 4—Gas, Petroleum, Liquefied, blended with other Petroleum Products, must be shipped in tank cars and described as required under regulations for the Transportation of Dangerous Articles other than explosives, paragraph 1521 (b). Gas, Petroleum, Liquefied, blended with other Petroleum Products, see Note 6			
4.30 p. m.	51	1218		<b>Generators, Formaldehyde Gas, in boxes, .....</b>	1	1	1	<b>Generators, Formaldehyde Gas, in boxes, .....</b> <b>*Fumigators, Dry Disinfectant, in boxes, .....</b>	1	1	1
Chicago April 26 1921 a. m.	52	1219	4	<b>GLASSWARE, see Note 1:</b> Glassware, other than Cut, see Note 1: Bottles, Carboys or Demijohns, old: Old Demijohns; or old Bottles other than Malt Liquor, Ginger Ale, or other than non-alcoholic Beverages: In shipping baskets or hampers, .....	R25	2	4	<b>GLASSWARE, see Note 1:</b> Glassware, other than Cut, see Note 1: Bottles, Carboys or Demijohns, old: Old Demijohns; or Old Bottles other than Malt Liquor, Ginger Ale, or other than non-alcoholic Beverages: In shipping baskets or hampers, .....	R25	2	4
				In carriers or crates without tops, .....	R35	3	4	In carriers or crates without tops, .....	R35	3	4
				In barrels, boxes or crates, L. C. L. ....				In barrels, boxes or crates, L. C. L. ....			
				In barrels with or without heads, or in boxes with or without covers, or in crates, C. L., min. wt. 20,000 lbs., subject to Rule 34. ....	5	5	D	In barrels with or without heads, or in boxes, carriers or crates with or without tops (covers), C. L., min. wt. 20,000 lbs., subject to Rule 34. ....	5	5	D
9.05 a. m.	53	209	21	<b>GRADING AND ROAD MAKING IMPLEMENTS:</b> Graders, Levelers, Road Rollers, Scarifiers, Scrapers or Traction Engines, in mixed C. L. with Dump Cars, Dump Carts, Dump Wagons, Road Drags, Road Plows, Stone Crushers, portable, with or without Elevators, Gravel, Sand or Stone Screening Machines, Stone Bins, wheeled, Street Sprinkling or Street Washing Wagons, Street Sweeping Machines, other than Hand, with or without Dust Collectors, or Wheelbarrows, loose or in packages, min. wt. 24,000 lbs., subject to Rule 34	5	6	A	<b>GRADING AND ROAD MAKING IMPLEMENTS:</b> * Graders, Levelers, Road Rollers, Scarifiers, Scrapers or Traction Engines, in mixed C. L. with Dump Cars, Dump Carts, Dump Wagons, Road Drags, Road Grader Blades, Road Scraper Blades, Road Plows, Stone Crushers, portable, with or without Elevators, Gravel, Sand or Stone Screening Machines, Stone Bins, wheeled, Street Sprinkling or Street Washing Wagons, Street Sweeping Machines, other than Hand, with or without Dust Collectors, or Wheelbarrows, loose or in packages, min. wt. 24,000 lbs., subject to Rule 34. ....	5	6	A
*Proposed by shippers					*Proposed by carriers.						
					6						

FIG. 16

assigns an article to a certain class, sooner or later some one will use the article as a basis for claiming the same class for some other article.

In Fig. 15 is shown a form for use when it is desired to secure a change in existing classification regulations. It will be noted that this form requires that both the *present* and the *desired* classification regulations shall be shown, and that the reason for asking the change must be given. For example, it may be that a shipper wants a lower minimum carload weight than is provided, because experience has shown that it is not possible to load the required weight in a car of usual size.

40. Though much of the work of the classification committees is conducted in an informal manner by conferences, correspondence, etc., there are many matters that require formal action in the form of hearings where both carriers and shippers may appear and present their respective views on the matters under investigation. The hearings held by the classification committees are not open to the public, but they are open to all who have a direct interest in the matter upon which the hearing is being held.

To enable those who have matters coming up before the committees to know where and when to appear, what is known as a docket is issued. Fig. 16 is a page from the docket issued by the Consolidated Classification Committee. A study of this docket shows that it contains information as to the time when hearings will be held, the matters to be dealt with, whether the change was suggested by carriers or shippers, etc. It should be understood that the traffic man who fails to attend hearings or send a representative, when matters of interest to him are up for action, may find his lack of interest reflected in unfavorable action by the committee.

The addresses of the three regional committees are as follows:

Official Classification Committee, 143 Liberty St., New York, N. Y.

Southern Classification Committee, Atlanta, Ga.

Western Classification Committee, Room 1830, Transportation Building, Chicago, Ill.

(To be Printed on "White" Paper)

STRAIGHT BILL OF LADING -ORIGINAL-NOT NEGOTIABLE.

Agent's No \_\_\_\_\_

at \_\_\_\_\_ 19

### The Rate of Freight from

to \_\_\_\_\_ is in Cents per 100 Lbs.

IF Times 1st	IF 1st Class	IF 2d Class	IF Rule 25	IF 3d Class	IF Rule 28	IF Rule 29	IF 4th Class	IF 5th Class	IF 6th Class	IF Class A	IF Class B	IF Class C	IF Class D	IF Class E	IF Special per ....	IF Special par.
-----------------	-----------------	----------------	---------------	----------------	---------------	---------------	-----------------	-----------------	-----------------	---------------	---------------	---------------	---------------	---------------	------------------------	--------------------

(Mail Address—Not for purpose of Delivery.)

Consigned to

Destination \_\_\_\_\_ State of \_\_\_\_\_ County of \_\_\_\_\_

[illegible]

Shipper \_\_\_\_\_ Agent \_\_\_\_\_

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

40



or other commodities caused by natural shrinkage or discrepancies in elevator weights. For loss, damage, or delay caused by fire occurring after forty-eight hours (exclusive of legal holidays) after notice of the arrival of the property at destination or at port of export (if intended for export) has been duly sent or given, the carrier's liability shall be that of warehouseman only. Except in case of negligence of the carrier or party in possession (and the burden to prove freedom from such negligence shall be on the carrier or party in possession), the carrier or party in possession shall not be liable for loss, damage, or delay occurring while the property is stopped and held in transit upon request of the shipper, owner or party entitled to make such request; or resulting from a defect or vice in the property or from riots or strikes. When in accordance with general custom, on account of the nature of the property, or when at the request of the shipper the property is transported in open cars, the carrier or party in possession (except in case of loss or damage by fire in which case the liability shall be the same as though the property had been carried in closed cars) shall be liable only for negligence, and the burden to prove freedom from such negligence shall be on the carrier or party in possession.

**Sec. 2.** No carrier is bound to transport said property by any particular train or vessel, or in time for any particular market, or otherwise than with reasonable despatch, unless by specific agreement indorsed hereon. Every carrier shall the right in case of physical necessity to forward said property by any railroad or route between the point of shipment and the point of destination; but if such diversion shall be from a rail to a water route the liability of the carrier shall be the same as though the entire carriage were by rail.

Claims must be made in writing to the originating or delivering carrier within six months after delivery of the property (or, in case of export traffic, within nine months after delivery at port of export) or, in case of failure to make delivery, then within six months (or nine months in case of export traffic) after a reasonable time for delivery has elapsed. Provided that if the loss, damage or injury was due to delay or damage while being loaded or unloaded, or damaged in transit by carelessness or negligence, then no notice of claim or filing of claims shall be required as a condition precedent to recovery. Suits for loss, damage or injury shall be instituted not later than two years and one day after the day on which notice in writing is given by the carrier to the claimant that the carrier has disallowed the claim or any part or parts thereof, specified in the notice. Where claims for loss, damage or delay are not filed, or suits are not instituted thereon, in accordance with the foregoing

The carrier may make a reasonable charge for the detention of any vessel or car, or for the use of trucks after the car has been held for forty-eight hours (exclusive of legal holidays), for loading or unloading, and may add such charge to all other charges hereunder and hold such property subject to a lien therefor. Nothing in this section shall be construed as lessening the time allowed by law or as setting aside any local rule affecting car service or storage.

Property destined to or taken from a station, wharf, or landing at which there is no regularly appointed agent shall be entirely at risk of owner after unloading from cars or vessels or until loaded into cars or vessels, and when received from or delivered on private or other sidings, wharves, or landings shall be at owner's risk until the cars are attached to and after they are detached from trains.

**Sec. 5.** No carrier will carry or be liable in any way for any documents, specie, or for any articles of extraordinary value not specifically rated in the published classification or tariffs, unless a special agreement to do so and a stipulated value of the articles are indorsed hereon.

**Sec. 6.** Every party, whether principal or agent, shipping explosive or dangerous goods, without previous full written disclosure to the carrier of their nature, shall be liable for all loss or damage caused thereby, and such goods may be warehoused at owner's risk and expense or destroyed without compensation.

**Sec. 7.** The owner or consignee shall pay the freight and all other lawful charges accruing on said property, and, if required, shall pay the same before delivery. If upon inspection it is ascertained that the articles shipped are not those described in this bill of lading, the freight charges must be paid upon the articles actually shipped.

**Sec. 8.** Except in case of diversion from rail to water route, which is provided for in section 3 hereof, if all or any part of said property is carried by water over any part of said route, such water carriage shall be performed subject to the liabilities, limitations, and exemptions provided by statute and to the conditions contained in this bill of lading not inconsistent with such statutes or this section, and subject also to the condition that no carrier or party in possession shall be liable for any loss or damage resulting from the perils of the lakes, sea, or other waters, or from explosion, bursting of boilers, breakage of shafts or any latent defect in hull, machinery or equipment.

## Company

# (To be Printed on "Yellow" Paper)

"Uniform Bill of Lading—Adopted by carriers in Official and Western Classification Territories."



# ENDORSEMENTS

## CONDITIONS.

**Sec. 1.** The carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto, except as hereinafter provided.

No carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto or delay caused by the act of God, the public enemy, quarantine, the authority of law, or the act or default of the shipper or owner, or for differences in the weights of grain, seed,

been duly sent or given may be kept in car, depot, or place of delivery of the carrier or warehouse, subject to a reasonable charge for storage and to carrier's responsibility as warehouseman only, or may be, at the option of the carrier, removed to and stored in a public or licensed warehouse at the cost of the owner and there held at the owner's risk and without liability on the part of the carrier, and subject to a lien for all freight and other lawful charges, including a reasonable charge for storage.

The Consolidated Classification is sold at an annual subscription price of \$2.00, which entitles the subscriber to all supplements (and reissues if there are any) for one year. Subscriptions should be placed with Consolidated Classification, Room 1830, Transportation Bldg., Chicago, Ill.

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## THE BILL OF LADING

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### BILLS OF LADING AND THEIR USE

41. One of the most important documents in traffic work is the bill of lading, different forms of which are shown in Figs. 17 and 18. It should be understood that as actually used both of these forms are about the size of Fig. 18, which is here given very nearly full size so that the conditions on the back may be easily read, these being the same for both forms. The illustrations are from the Consolidated Classification, where it was desired especially to call attention to the different colors of paper that were to be used. On the actual bill of lading the name of the carrier receiving the shipment appears at the top in the line indicated by.....*Company*, and all above this is omitted.

The bill of lading serves a twofold purpose: (1) It contains the contract under which the transportation of the shipment is undertaken. The conditions of the contract may be either written, printed, or included in tariffs or other printed regulations of the transportation companies. (2) It contains the shipper's instructions as to the handling of the shipment, the description of the shipment, and other essential information.

From the standpoint of designating who is entitled to take delivery of the shipment, bills of lading are of two forms, *straight* bills of lading and *order* bills of lading.

42. The **straight bill of lading** is shown in Fig. 17. In this form it will be noted that provision is made by which a shipment is consigned direct to a party specified, following

the words "Consigned to," and it is assumed that this party is the owner of the shipment. Ordinarily the transportation companies do not require the surrender of the straight bill of lading before making delivery of the shipments at destination except where the party desiring to secure possession of the freight is not known to the representatives of the transportation company or where the document is necessary to determine the amount of charges due because the regular billing has not been received. In the latter case a copy will often serve the same purpose.

The straight bill of lading, it will be noted, is not a negotiable paper to be used in financial transactions. The straight bill of lading for domestic traffic is printed on white paper in order that it may not be confused with the order bill of lading, which is usually printed on yellow paper.

**43.** The **order bill of lading**, shown in Fig. 18, differs in some important respects from the straight bill of lading. It will be noted that by its provisions the shipment is made subject to the order of one party with provision for the same or some other party to be notified when the shipment arrives at its destination. The surrender of the order bill of lading is usually required before delivery of the property will be made by the transportation company. In cases where the bill of lading cannot be produced, the party who desires to secure possession of the freight will have to file a bond of indemnity of sufficient amount to protect the delivering carrier against any damages that might arise from delivery of the property to the wrong party. In connection with the matter of wrong deliveries, it should be understood that the damages for which the carrier might be held are not limited merely to the value of the property, as there might be other damages, such as the inability to fill a contract, which would come in for consideration.

The right to secure possession of the property covered by an order bill of lading may be provided by endorsement on the back of the bill of lading in the space provided for that purpose, as shown in Fig. 18. Endorsements may be either *in blank*—that is, the owner may merely sign his name—or, in connection

with his signature, he may definitely specify who is to receive the property. The representatives of the carriers will pay close attention to the endorsements on order bills of lading, because of the many cases where they have been held liable for delivering to the wrong party. There have been frauds running into the millions through the issuing of fraudulent bills of lading and through fraudulent endorsements.

**44.** A very important use of the order bill of lading is as collateral to secure an advance of funds on shipments that have been turned over to the carrier for transportation, but which have not been delivered to the consignee. A great many millions of dollars a year are involved in transactions of this kind, which is one reason why it is necessary that there shall be no irregularities in connection with order bills of lading.

The method by which bills of lading are used in connection with the raising of funds is, briefly, as follows:

1. After the carrier has receipted the bill of lading, the owner of the bill of lading attaches a draft or other papers to the bill of lading and takes it to a bank at the point of origin or elsewhere. If the party presenting the papers is known, or presents satisfactory evidence of his reliability, the bank will advance him funds upon the strength of the receipted bill of lading, which it will hold as security. The proportion of the value of the goods represented by the bill of lading that will be advanced will depend upon circumstances, but in most cases it will be a substantial part of the value of the shipment. For example, if the value of the shipment is \$900 it would not be unusual for an advance of at least \$600 to be made. In other words, before a shipment has gotten very far on its way, the owner has received some considerable part of the value of the shipment to use in the purchase of raw materials, or for such other purposes as he may see fit.

2. The bank that has advanced money on the bill of lading forwards the papers to some other bank, preferably at the point of destination, to collect the charges from the party who is to receive the shipment.

3. When the shipment reaches its destination, and the party who is to receive it is notified of its arrival, he must go to the bank that holds the bill of lading and other papers and pay the charges. When this is done he receives the bill of lading properly endorsed and presents it to the transportation company to secure delivery of the property.

4. The next step in the transaction is for the bank that has collected the charges to remit the amount collected, minus necessary expenses, to the bank from whom it received the papers.

5. The bank with whom the transaction originated makes final settlement with the original owner of the bill of lading by paying any amount still due after expenses have been deducted.

The value of this method of transacting business is great, as it enables owners of bills of lading to have the use of money days, weeks, or months before delivery of the shipment is made at destination, and there are banks in some of the larger cities which make a specialty of handling these transactions.

The order bill of lading, as used in domestic traffic, is printed on *yellow* paper so that all who are handling the document will be warned that it is the order bill.

45. Domestic bills of lading are commonly issued in triplicate; the three parts are as follows: (1) The original as shown in Fig. 17 or 18. (2) The shipping order, which is the copy of the bill of lading which is retained by the carrier for its records. The shipping order is similar to the bill of lading, except that there is no provision for a signature by the carrier's representative. Shipping orders for straight bills of lading are on *white* paper, while those for order bills are on *blue* paper. (3) A memorandum copy, which is just what its name indicates, a memorandum. In some cases there may be more than one. Memorandum copies are the same in form as the original, except that they are marked "Memorandum," and are really little more than evidence that such a bill of lading has been issued. While the practice varies, it is not generally customary for the carriers to sign more than one memorandum copy.

The memorandum copy can never be used in place of the original of the order bill of lading although it may be used in place of the original straight bill of lading. In cases where it is desired to secure such information as the point of origin of a shipment, the memorandum copy will serve the purpose, but the bill of lading is required for such purpose as filing a claim.

46. When the bills of lading signed by the carrier have been returned to whoever has charge of them in the shipper's place of business, they should be inspected to see that they have been properly signed and stamped, and that they include acknowledgment of any charges paid. Particular attention should be paid to any notations, or exceptions, on the bill of lading, which indicate any shortage or damage to the shipment when received by the carrier. An exception on an order bill of lading, such as "*one case in bad condition*" will often result in a bank's refusing to advance money on the bill. Many shippers have standing instructions that no shipment is to go forward with any exception noted on the bill of lading. Under such instructions, a case that was found to be in bad order would be replaced before the shipment went forward. There are several good reasons why freight should not go forward when it is in sufficiently bad order to warrant the making of an exception on the bill of lading. Packages that are in bad order before they start will probably get worse as they move, and also a notation on the bill of lading may be sufficient to prevent the collection of a claim, although the loss or damage may actually have occurred after the shipment was in the possession of the carrier.

47. The matter of the disposition to be made of bills of lading after they have been signed and inspected is to a considerable extent a matter of policy with the individual shipper. It is essential that the original of an order bill of lading shall be immediately started on the way to destination, through the bank or other channels, as delivery cannot be secured without this form. As the surrender of the straight bill of lading is not required, there is no uniformity of practice as to whether the shipper will retain it or send it to the consignee.

The matter is sometimes regulated by the policy followed relative to the filing of claims. If the shipper is in the habit of filing claims on outgoing shipments, he may properly keep possession of the bill of lading; but if the consignee will file the claim, if it arises, the bill of lading may properly go to the consignee. In all cases, whoever has possession of the bill of lading should make it a point to keep it where it can be found without delay, as there are many times when it is needed.

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#### BILL OF LADING CONDITIONS

48. The conditions printed on the bill of lading are very important, as they determine not only the general conditions under which a shipment moves, but they often have a direct bearing on the amount of charges paid. In general, the conditions on bills of lading for domestic shipments are quite different from those on bills of lading issued by carriers transporting shipments to foreign countries. Usually it will be found that carriers of foreign traffic assume much less liability for loss and damage than do domestic carriers.

49. The first condition on the bill of lading which is worthy of note is the provision that appears at the top of Fig. 18 and provides that the property is accepted subject to the provisions of the tariffs and classifications in effect at the time the bill of lading is issued. The effect of this provision is that the provisions of such publications as the Consolidated Classification must be adhered to in making a shipment just as though they were printed on the bill of lading. For example, if a shipper offers to a carrier a package that does not comply with a provision of the Classification relative to the packing of that shipment, the carrier can properly refuse to accept the shipment, because the classification provision automatically incorporated in the bill of lading has not been complied with. To put the matter in another way, all the publications covering a shipment must be considered together with the bill of lading as providing the complete conditions under which a shipment moves.



**50.** The conditions that appear on the back of the bill of lading, as shown in Fig. 18, should be understood by shippers, as all are of importance. Special attention, however, is called to the following:

A portion of Sec. 1 provides for a change of the liability of the carrier to that of a warehouseman, on goods that are not removed from the possession of the carrier within a certain time. Generally the carrier as a warehouseman can be held only for reasonable care, as compared with a very strict liability for anything that happens while the shipment is being transported. That is, if a consignee leaves a shipment in a freight house for several days after being notified of its arrival, he will have much greater difficulty in collecting for loss or damage that may result while it is in the freight house than if the shipment was lost in transit. This change in liability is, therefore, a matter to be given consideration when there is a delay in taking delivery of shipments at destination.

**51.** In connection with the first paragraph of Sec. 2, attention should be given to the fact that the carriers do not undertake to do more than move shipments with "reasonable despatch," except in a limited number of cases where the nature of the commodity or other conditions may make it necessary to accept traffic under more specific conditions. Live stock, fruits, and vegetables are among the commodities that often are moved under a definite agreement to deliver within a certain time, to deliver for certain markets, or with other limitations. While "reasonable time" is the standard set for determining whether the carrier has performed its contract, this is a term that can be definitely defined only in connection with the circumstances surrounding a specified case. For example, if it ordinarily takes 5 days to move a shipment between two points, 20 days would not be considered as reasonable time unless a good reason for such excessive time could be shown, as in the case of heavy snowfalls, etc. While to obtain damages for delay the shipper must prove negligence on the part of the carrier, still if the time consumed is much more than the usual time, the law will presume that the delay was

unreasonable and the burden of proof to the contrary will be on the carrier. However, since the carrier is in possession of facts not known to the shipper or the consignee, it is often difficult to prove the carrier negligent.

Generally a guarantee of the time of delivery of a shipment carries with it a higher transportation rate than when such guarantee is not given. This is well illustrated in the case of livestock, where the rates assessed include the giving of very special service.

**52.** That part of Sec. 2 which limits the time within which claims must be filed and suits started is of special importance. An almost unbelievable number of claims, that are otherwise perfectly valid, are rejected because the provisions of this limitation are not complied with.

It has long been recognized that the carriers may limit the time for filing claims, and the provisions of Sec. 2 of the bill of lading are in harmony with the provisions of Sec. 20 of the Interstate Commerce Act; in fact, the provisions of the bill of lading are somewhat more liberal than are required by this section of the Act.

In connection with the limitation as to the time for filing claims, it is well to understand that notice of *intention* to file a claim will serve to meet the requirements as to filing a claim within the specified time. For example, shippers asking carriers to trace for missing property may incorporate in their tracer notice of intention to file a claim if the property for which the tracer is asked is not delivered. Again, if a carload is received in such a condition that it will probably be necessary to file a claim, the consignee may file a claim subject to revision later on. With such a notice given, there will be ample opportunity to collect necessary information, documents, etc., without fear that the claim may be declined because it was not filed in time.

**53.** The right of the carriers to store property, either on their own property or in public warehouses, is fully recognized and finds extensive application in actual practice, so that the provisions of Sec. 4 are of importance to shippers and receivers

of freight. The conditions under which the storage service is furnished are dealt with in another Section, but the important fact to be noted here is that such storage service is performed in a great many cases.

The right of the carriers to put property in storage at the owner's expense is based upon the carrier's sending out an arrival notice to the right address, and at a specified time. If these conditions are complied with, the fact that the arrival notice does not reach the consignee or reaches him late does not void the right of the carrier to put the property in storage, either its own or public.

**54.** An amount of freight which is greater than it should be goes to storage because of incorrect or inadequate addresses on the bills of lading or on the freight itself. For example, in shipping to large cities, street addresses must be shown; and if such designations as *East* and *West* are required in connection with the numbers or names of streets, care must be exercised to see that such designations are neither omitted nor interchanged. The substitution of *East* for *West* in a street designation in New York might be as serious as sending the shipment to the wrong city.

**55.** While it should not be necessary to emphasize the fact that the conditions of a contract should never be altered without the knowledge and consent of both parties, it is true that the practices referred to in Sec. 9 are more or less prevalent. For example, after the carrier has signed the bill of lading for *nine* cases the shipper may find that he actually shipped *ten* cases, and may alter his bill of lading to read accordingly without notifying the carrier. If, at its destination, the shipment should be delivered one case short, the fact that the shipper's records and his copy of the bill of lading showed ten cases would probably not count as against the shipping order in the possession of the carrier showing only nine. Any changes, no matter how slight, should be taken up with the carrier and changes made in definite form and with the knowledge of all concerned.

**56.** Besides the conditions that are printed on the bill of lading, additional conditions or instructions are sometimes

written on and become a part of the contract for transportation. Such conditions are not what may be termed "standard," as are the printed conditions, but are those which are applicable only to certain classes of traffic or to traffic moving under specified conditions. For example, where traffic is handled in refrigerator cars it is often necessary to put instructions as to icing on the bill of lading. Again certain commodities are transported under specific agreement as to the value of the shipments. These conditions, like the printed conditions, become a part of the bill of lading once the bill has been signed by both parties, therefore, the proper time to take exception to such conditions is *before* and not *after* they have been accepted. Whatever may be the facts as to the reasonableness of such conditions, it never helps the situation to agree to them and then try to get away from them later on.

# PACKING AND MARKING

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## PACKING

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### GOOD AND BAD PACKING

1. The primary object to be attained in packing freight for transportation is to secure adequate protection against loss and damage. What constitutes adequate protection must be considered from two standpoints: (1) The judgment and knowledge of the shipper and the consignee as to how the goods should be packed to meet the wear and tear of transportation; (2) the regulations of the transportation companies.

It is often the case that the ideas of the shipper, in regard to packing, are in harmony with the regulations of the carriers as to what constitutes adequate packing, but in other instances there may be differences of opinion, although the regulations of the transportation companies will govern in such cases. It must be remembered that the regulations of the transportation companies are based upon broad general experience, while the experience and knowledge of shippers and consignees may be more or less individual in their scope. For example, the shipper of a certain commodity may feel that the regulations applicable to his traffic are unreasonably stringent in view of what he knows about the packing of what he has to ship, but he must remember that less stringent regulations might allow shippers that are inclined to be careless to make use of inadequate methods of packing that would result in damage claims.

Therefore, the shipper who would not take unreasonable advantage of some leniency in the regulations often is put to what seems unnecessary trouble because there are those who would.

2. On the other hand, there often are circumstances where mere compliance with the regulations of the transportation com-



FIG. 1

panies will not furnish sufficient protection in the individual case. In such instances, he is a foolish man who takes only the regulations as his standard. Such a man is like an automobile driver who, because regulations allow a speed of 15 miles an



FIG. 2

hour, neglects to slow down when his own judgment tells him that such a speed would be likely to cause an accident. To summarize the situation, a package as good as the regulations call for must be used in every case, and a better one should be used when efficient shipping requires it.

3. An example of bad packing is shown in Fig. 1, which shows a package used for shipping fresh fish packed in ice. Here two frail boxes not suitable for the service have been nailed together, and it is evident that such a package would stand but little rough handling and would give but poor protection to its contents. A box made of sufficiently heavy lumber in the form shown in Fig. 2, if properly nailed, would give about all the protection possible. Such a package as that shown in Fig. 1 might be accepted by the carrier, but usually it would be unwise to use it.

Each different commodity furnishes its own problems in packing, and the importance of solving them properly is becoming better understood. An illustration of the opportunities that exist for improvement in packing and packages is furnished by the fact that though the shippers of eggs have for a long time been trying to find the best method for packing eggs, the express companies alone are paying out more than a million dollars a year for damage to eggs, and the damage to eggs sent by freight is very large.

4. Under the head of packing, two subjects must be considered, packages and packing; that is, the container which holds and protects the shipment, and the method used in filling it. An ideal container may lose its value if the contents are put into it in an improper manner, or, on the other hand, the best of packing cannot save an inadequate container. For example, a box may be designed for the shipment of a certain commodity, with the understanding that the contents will be packed tightly so that they cannot move about in the package. If, then, the goods are put in the box loose so that they can rattle around and damage themselves and break out the side of the box, it is no fault of the package used, but rather of the method of filling the package. Again, every precaution may be taken to see that goods are held firmly in place in a box, but if the box is not strong enough to carry the weight of the shipment, the care in packing will be wasted.



### WHAT HAPPENS TO PACKAGES EN ROUTE

5. For an understanding of the packing problem, it is necessary to consider what the things are that happen to a shipment while it is en route, some of them that must be considered are as follows: (1) The packages may be damaged either by the shifting of their own contents, by contact with



FIG. 3

other packages, by being dropped on freight house floors, docks, etc., and by rough handling in general. (2) Moisture in the air, as well as contact with water, may effect more or less serious damage, especially to certain commodities such as many kinds of metals. The liability to damage is further increased if there is salt in the air or water. (3) Pilferage is an ever-increasing source of trouble, particularly in connec-

tion with export freight. Where the value of the shipment or other conditions justify, personal protection may be given the shipments at all times or it may be practicable to use containers that can be tampered with only with considerable difficulty; but such expense is not justified in connection with most property which is transported as freight. About all that can be done with this class of property is to use containers pro-



FIG. 4

ected by metal straps, seals, or other devices, that must be broken or otherwise affected if the package that they protect is opened. Such seals, etc., when broken, at least call attention to the fact that the package has been tampered with and thus help in placing the responsibility for loss.

All of these things and the influence that each may have on the kind of packing required, have to be considered in

determining the proper method of packing for each of the thousands of commodities shipped.

6. Examples of adaptation of the method of packing to the needs of fragile articles are shown in Figs. 3 to 7 inclusive.

In the shipping of glass it is essential that the cases in which

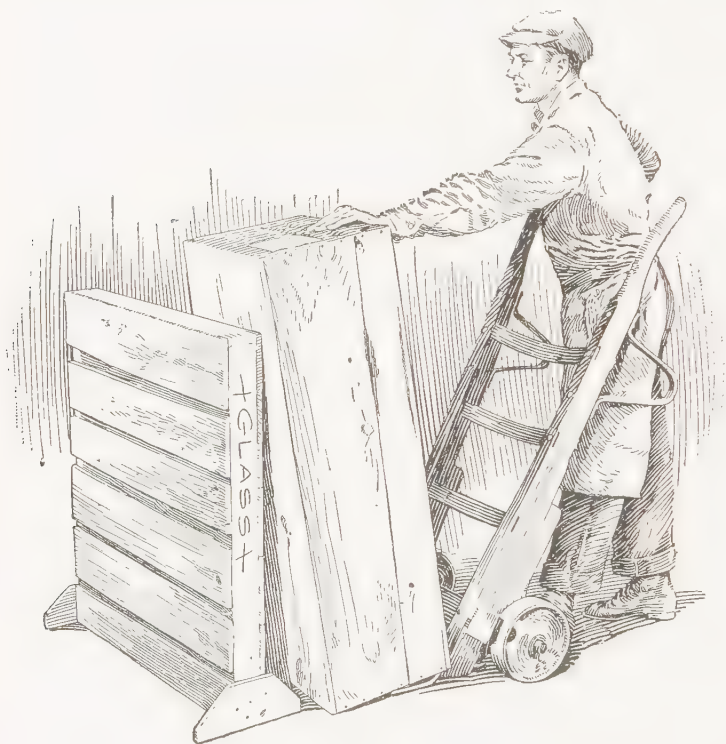


FIG. 5

it is shipped shall stand on edge, as in Fig. 3; but in many instances this will be done at the risk of a tip-over, such as is apparently about to occur in Fig. 4, because the man who is taking the neighboring case does not know or does not care about the case behind the one that he is after. The risk that the case containing the glass may be knocked over is greatly reduced by the addition of two wooden feet, as is shown in

Fig. 5, as these will enable the case to stand upright against a reasonable amount of pressure from other packages.



FIG. 6

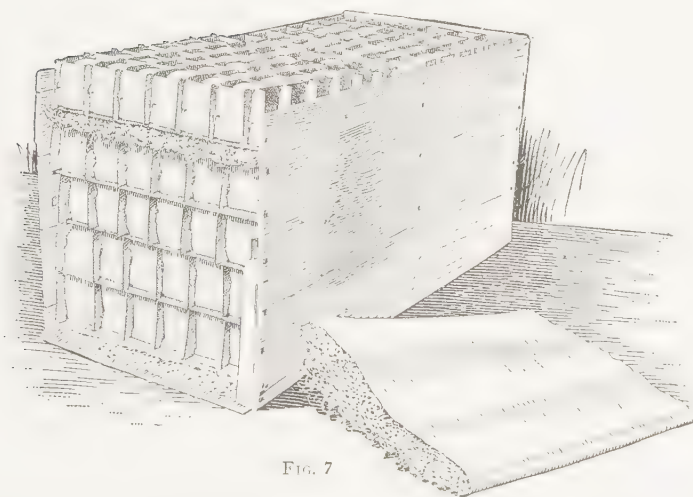


FIG. 7

Fig. 6 shows a container for globes, which, in addition to having air cushions to break the jar when the package is

handled, is provided with perforated "sunbursts" in the covers against which the tips of the globes can rest.

While no method has yet been found that will entirely eliminate the breakage of eggs in transit, Fig. 7 presents a very effective method of reducing such breakage. The method

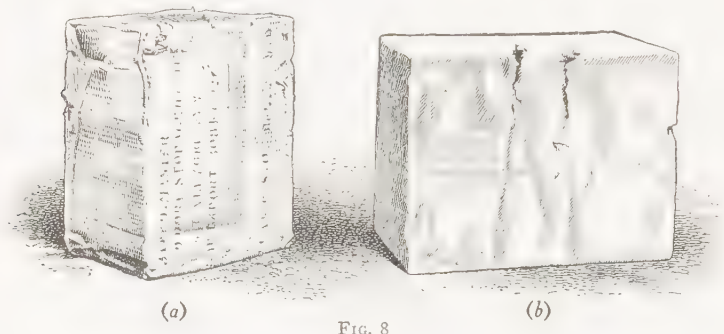


FIG. 8

referred to involves the use of six excelsior pads in each crate, three in each half of the case, which is partitioned in the middle. Two of the pads are placed as shown in Fig. 7 and the third is placed on top of the top layer. The use of the

pads in this manner gives stability to the layers of eggs without producing such rigidity as would be liable to increase rather than decrease breakage.

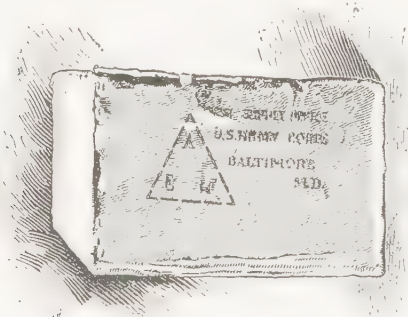


FIG. 9

7. The number of packages damaged in wrecks is small compared to the number

transported, but most of the damage to freight results from what may be called the incidents of transportation. These include all those things that are necessary to the routine of handling a shipment and some things that are not necessary, but which it is reasonable to expect may happen.

Thus the injuries shown in Fig. 8 (a), are due to the hoisting of a number of packages together in a rope net; the injuries shown in Fig. 8 (b) are cuts made by an ordinary rope sling

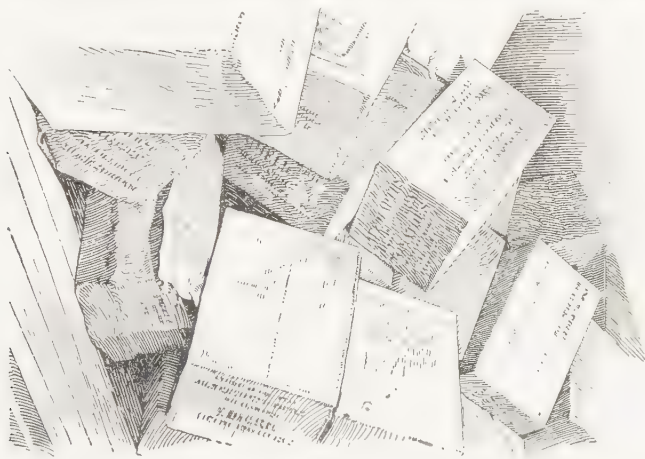


FIG. 10

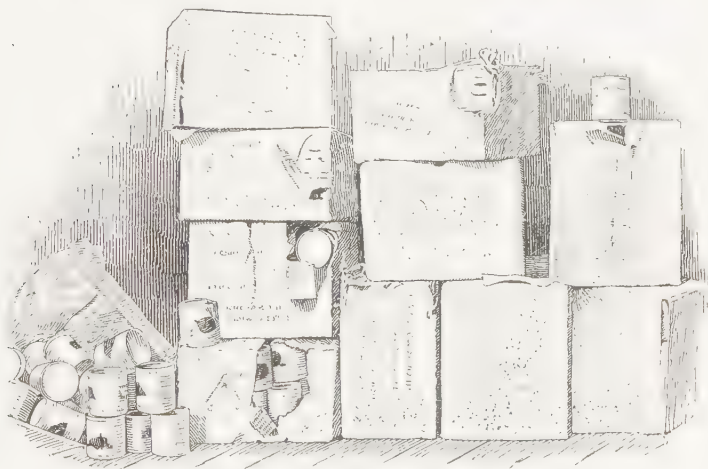


FIG. 11

used for hoisting several packages at once. The damage shown in Fig. 9 is due to chafing of the packages during transit. All these forms of injuries result from methods of handling or



conditions that are necessary under certain circumstances and that are to be expected.

Figs. 10 and 11 show the effects of accidents that are always to be expected, though they ought not to happen. Fig. 10 is a view as a car door was opened, and shows the effect of rough handling of the cars in the railroad yards. Fig. 11 shows the result of the treatment such as indicated in Fig. 10.

It might be thought that the packages shown in Figs. 8 to 11, inclusive, were inadequate to meet the conditions; but when



FIG. 12

it is stated that the shipment from which the illustrations were taken came from various parts of the United States, was transferred to ships at different ports, was carried across the ocean and again transferred to cars under unfavorable conditions, and in all only 5.4 per cent. of the whole lot was set aside for re Coopering, it will appear that, in the shipment as a whole, the packages stood the journeys well. In view of what happened to a few, it is easy to imagine what might have happened on such a journey if the cases had not been of good strength.



8. Wrecks of packages not strong enough to finish their journey are all too familiar sights to employes of the carriers. The causes of failure are as varied as the packages. That the

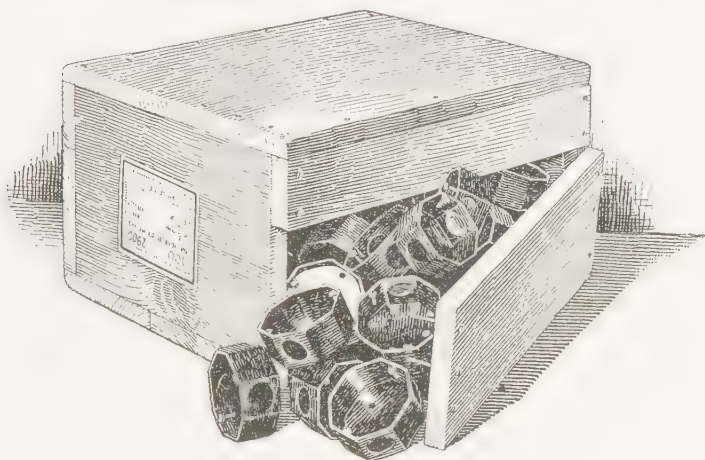


FIG. 13

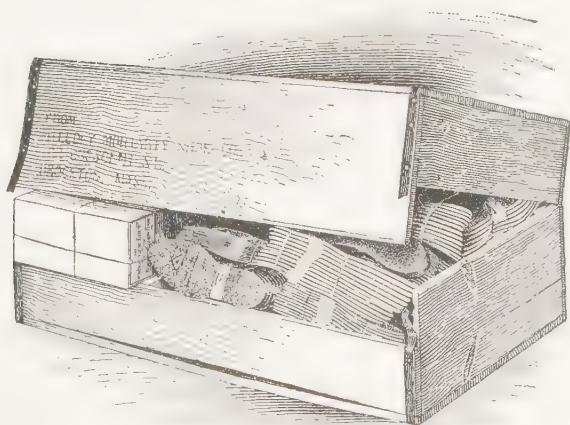


FIG. 14

pasteboard box shown in Fig. 12 would be cut through by the rope, should have been evident to the packer when he saw that the box was not filled by its contents. The box shown

in Fig. 13 could have been made safe by the use of metal straps; but the case shown in Fig. 14 was not strongly enough constructed for the load it was to carry, even though metal straps were used.

#### DETERMINING FORM AND MATERIAL OF PACKAGE

9. For a practical solution of the packing problem, it must be understood that while protection of the shipment is the primary object of packing, it is necessary that this shall be accomplished without too great expense for the package itself and without making the package so heavy or bulky as to incur unnecessary freight charges. The different factors that have to be considered in planning an economical package are shown in Fig. 15, which is from a publication of the Chicago Mill and Lumber Company. The many losses enumerated in the left-hand column show the error of the idea held by some that payment received for a freight claim is complete compensation for any loss incurred in connection with a lost or damaged shipment.

10. During the World War, the United States War Department, having the problem of getting army supplies overseas, gave intensive study to the subject of packing in such a way that the goods not only would arrive safely, but so that unnecessary weight would be avoided and as much material as possible would be got into the space available on ships.

The experience of that department has made some permanent contributions to the solution of the packing problem, particularly as concerns export shipments. To mention just one of these results, it was found that baling as an efficient method of packing had possibilities beyond the realization of most people, and that a wide variety of articles could be successfully baled. For example, a shipment of 327 dozen saws was baled to advantage. Among the advantages which are rightfully claimed for bales over other forms of packages when the goods are of such nature that they can be baled, are: (1) The saving in space occupied; (2) the saving in the weight of the container, the amount of this saving being given by well-informed

authorities as running as high as 97 per cent.; (3) better protection of the shipments.

### Losses Due to Containers That Are

#### too weak

A package that fails to hold up is an endless source of annoyance. It entails:

1. Damage claims against the transportation companies, which may or may not be settled.
2. Trouble to customers, if goods are shipped f. o. b., and more or less bad feeling on their part—a very important consideration in view of the usual independence of buyers.
3. Unreasonable requests for damages by the consignee, which the shipper will grant rather than lose the customer's good will.
4. Voluminous correspondence.
5. Loss of time in getting goods on customer's shelves, from which they must be moved before there can be a reorder.
6. Loss by theft when contents are exposed. In some foreign ports, pilferage of freight amounts almost to a regular profession on the part of dock workers and loafers.
7. Expense of handling and re-coopering bad-order packages.
8. Money tied up awaiting settlement of loss and damage claims, which amount to millions each year against railways alone.
9. Higher freight rates generally, as these are fixed by authority, to allow for big losses in claim settlements.

#### too strong

The most economical package requires the use of no more lumber or nails than are absolutely necessary to carry its burden safely to its destination. A package that is too strong entails:

1. Excess of materials, which mean so much wastage. The unnecessary use every year of 1,500,000,000 feet of lumber worth \$120,000,000, in making boxes and crates, is a definite money loss to manufacturers.
2. Loss in space. Ocean freight rates, space in warehouses, cars, and trucks, cost manufacturers far more than they would need to pay.
3. Loss in overweight freight or express costs. By redesigning for different arrangement of contents and use of different materials, the weight of loaded boxes has in some cases been reduced as much as 35 per cent., at the same time they were made stronger and less expensive.
4. Loss by failing to design for actual use. Some shippers use as heavy boxes for ordinary domestic service as they do for water transport, where boxes are usually loaded by derricks and nets, and where water hazard enters. This practice is, of course, exceedingly wasteful.

FIG. 15

An example of the effectiveness of baling was furnished by two bales of leggings, that went overseas and returned in bales,

and came back to this country in just as good condition as when they went over, while the remainder of the shipment, which traveled in cases, came back with packages broken and a considerable portion of the contents missing. The freight charges on the two bales were \$6.60, while the same quantity of the same goods in cases cost \$30.80. Translated into cost per pair, the saving amounted to 5½ cents per pair. To appreciate fully the value of the space-saving feature of baling, it must be remembered that overseas freight charges are usually based upon space occupied.

**11.** In the study of the packing problem the War Department, received highly effective aid from the Department of Agriculture. While the work of the War Department was along the lines of such activities as were necessary to getting army supplies overseas, the work of the Department of Agriculture is a continuing service, which is now helping all interests in developing better packing methods.

**12.** In the commercial field, the box manufacturers, individually and through organizations, furnish very effective service in helping the shipping public to solve their packing problems. While the attitude of manufacturers of packages used to be that they would gladly fill your order if you would tell them what you wanted, they now undertake to help you find what it is that you want, and if a shipper will tell what it is he has to ship, the proper package will be found for him. The transportation companies are doing their part in getting better packing, both by pointing out ineffective packing methods and by demonstrating what is effective. Much work along this line has been done by a careful analysis of the causes of loss and damage to property. It was through such investigation that it was found that better loading of cars would reduce damage in transit and that second-hand cases were responsible for an excessive number of loss and damage claims.

**13.** While the Department of Agriculture has for a long time been rendering very effective service in helping to improve packing methods in the handling of agricultural products, it

has been helping along broader lines through the medium of the Forest Products Laboratory. One of the publications of the Laboratory states that in the early days of the United States Forest Service, far-sighted men saw that if American woods were to be used to the best advantage, and if American wood-using industries were to keep up with the progress in other industries, detailed technical information about the properties and possible uses of wood must be obtained. The result of this foresight was the establishment of the Forest Products Laboratory in buildings furnished through the cooperation of the University of Wisconsin at Madison, Wisconsin, with the object of turning the searchlight of research upon wood and its uses, and of making the information thus obtained available to the public.

This Laboratory has accumulated a large store of fundamental information about the mechanical, physical and chemical properties of wood. It has also studied the application of this information to the problems involved in the manufacture of wood products and chemical products derived from wood. In the study of manufacturing problems, materials used with the wood often require as much attention as the wood itself in order to produce a satisfactory finished product. This fact has necessitated the study of such subjects as glues, moisture-proof coatings, wood preservatives, laminated wood, and fire-retarding materials.

To accomplish the work for which it was founded, the Laboratory is engaged in: (1) Acquiring fundamental knowledge about wood; (2) applying this knowledge to practical uses of wood; and (3) seeing to it that economical methods and materials developed are utilized to the best advantage.

**14.** The part of the work of the Laboratory that applies particularly to the packing problem consists of field investigations and laboratory tests on shipping containers and covers, comprising:

Cooperation with the manufacturers.

Study of containers and methods of packing.

Study of loss and damage to containers.

Working out details of balanced construction.

Preparation of designs and specifications.

Instruction of industrial representatives.

Work of this character includes the preparation of reliable specifications for all types of shipping containers, their construction being based on the character of their contents and the strength necessary to protect them. The investigation applies to fiber and other boxes, crates, barrels, baskets, etc., the purpose being to conserve materials of construction, obtain the most serviceable containers with the minimum amount of material, to save shipping space and warehouse space, and to prevent loss of contents by theft.

Those interested can obtain full information in regard to the work of the Laboratory by addressing the Director, Forest Products Laboratory, Madison, Wis.

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## MAKING GOOD BOXES

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### REQUIREMENTS AND MATERIALS

**15.** A good packing box must be suited to the conditions under which it is to be used. Therefore, no one style of box can be said to be best for all occasions. However, the usefulness of a packing box is dependent on certain qualities of the materials of which it is made and on the method by which they are fastened together.

A detailed study of the effects of such factors on the strength of boxes has been made by the Forest Products Laboratory, and the results as published are given in the following pages.

**16. Balanced Packing-Box Construction.**—A properly designed packing box is one that has enough strength in each part for the purpose for which it is intended, and no more strength in any part than is necessary to balance the average strength in every other part. The data necessary for designing such a box cannot be obtained from observation of boxes in



commercial service, because the observer sees the box only after it has completely failed. He does not see the beginnings of the failures; and he does not see and consequently cannot measure the hazard which completes them. A failure frequently bears evidence in itself of the cause of the damage; but there is no way of determining from a study of the failure the amount of force exerted by the damaging cause, and in cases where several causes have been active it is impossible to identify the effect of each of them. On the other hand, laboratory studies combine practical experience (which is a knowledge of the designs in use, of what lumber is available, and of box-factory practice) with accurate scientific tests made on the package itself, packed as in actual service, and subjected to strains that approximate those encountered under actual transportation conditions.

**17. Tests to Determine Box Design.**—Compression-along-an-edge test, as its name implies, is a steady and constantly increasing pressure (measured in pounds) applied along any edge and with the opposite edge, diagonally through the box, in a direct line with the pressure exerted. The corner-wise test is applied in the same way to any corner of the package, with the opposite corner in a direct line with the pressure. These two tests measure the strength of the box in withstanding any external pressure, and to a limited extent approximate the hazard of the lower tiers of boxes in a pile. By themselves these tests are insufficient to determine comparative weaknesses in the various factors that enter into properly balanced constructions.

**18.** Another very good test is the drop test, especially for comparing the strength of one box with that of another. In this test the box is packed with the actual contents as in service and dropped from a predetermined height directly on the corner, which is a fall that may occur in actual service. For construction purposes, however, the value of the conclusions drawn from such tests, is limited, because one failure runs so rapidly into another that the observer does not always get the true measure of the weaknesses.



**19.** The most practical method yet devised for testing packing boxes is the revolving-drum test. The drum, as shown in Fig. 16, is a hexagon-sided machine which revolves slowly. The box to be tested is packed with the actual contents, as in commercial service, and placed in this drum. In the drum are arranged a series of hazards, which cause the box to follow a regular cycle of drops, falling upon sides, top, bottom, ends, edges, corners, and flat-wise upon a projection similar to the corner of another box. These drops simulate the usual hazards of transportation, excepting the heavy static pressure received by a box in the lower tiers of a pile, which is secured by means of the compression-on-an-edge test already mentioned.

As the box moves on from one drop to the next the observer notes the beginning of the failure of the weakest point in its construction and follows the development of that weakness until the box entirely fails and lets its contents out.

The weak feature of the box may be too few nails, nails of too short length, nails driven in a crack and thus having no great holding power, or some other form of nail failure; and the tests clearly show this weakness. The material in the sides, top, or bottom may be too thin, so that the shocks of the falls pull the wood from the nails. The wood may split or break across the grain.

Any one of the numerous weaknesses of packing-box construction may be developed in this test until finally the observer, by making suitable alterations in design, is able to build up a box that is practically equally strong in every feature. Such boxes when tested will show failures ultimately occurring in about the same number from nails pulling from the wood, wood pulling from the nails, splitting or breaking of ends, sides, tops or bottoms, and through the weaknesses of the particular kind of wood used.

**20. Industrial Conditions That Affect Box Design.** Commercial conditions and practices in box factories enter into consideration in the designing of containers of proper construction. Packing boxes are made of low-grade lumber. This

lumber is low grade because of splits, shakes, knots, knot holes, decay, or other defects. Such defective parts as will affect the proper efficiency of the box must be cut out; but those

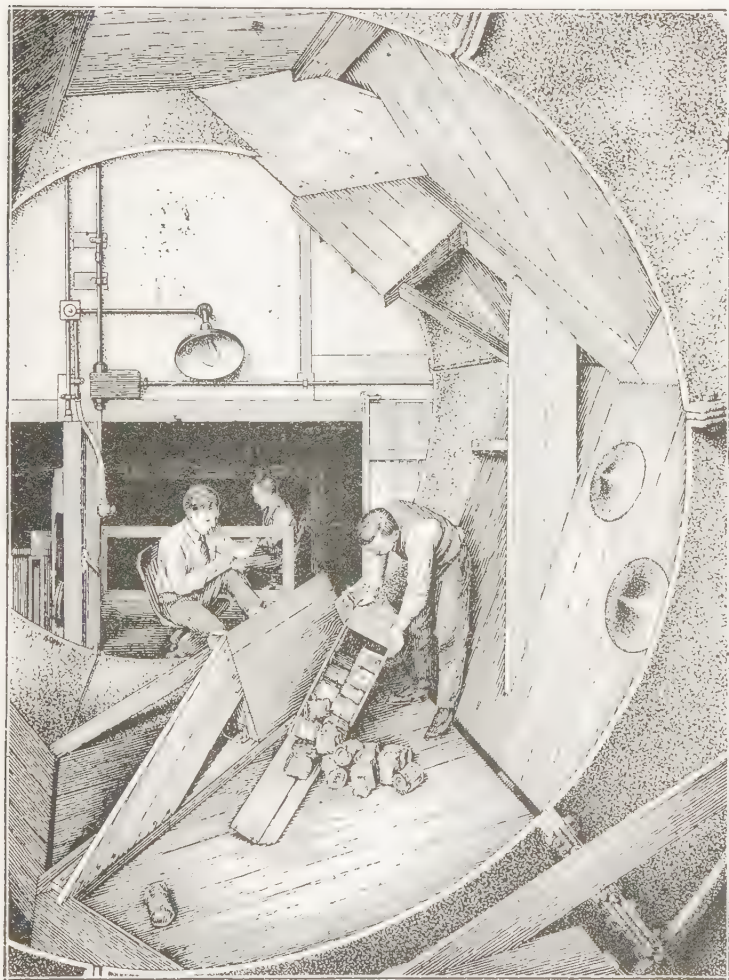


FIG. 16

defects which do not destroy the proper balance of the construction should be permitted, so as to keep down the cost of lumber.

As lumber is sawn into such thicknesses as bring the best market prices for the high grades, the low grades must be necessarily of the same thicknesses. The thicknesses specified in the packing box must be obtainable from this lumber without undue waste.

Certain box-factory equipment is standard. This should be kept in mind, and no construction should be adopted that requires special equipment unless some essential features of construction cannot be obtained otherwise.

**21. Aids in Box Designing.**—As a result of many box tests of all kinds, certain aids of somewhat general application

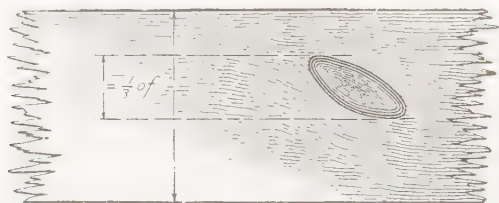


FIG. 17

in designing packing boxes may be suggested. No general rules can be laid down, however, for the reason that each box must be built with reference not only to the external shocks it will have to endure, but also to the nature of the article it is to contain. Some commodities require partitions, trays, diaphragms, and the like. Some commodities are affected by heat or cold. Some commodities contribute strength to the package; others are fragile, so that all the required strength must be in the box itself.

A design that takes into consideration these points and the conditions in the industry as well, will result in well-balanced construction and the most practical and economical package for the purpose intended; but laboratory tests on the box, packed with the commodity that it is to hold, are necessary to make certain that all the qualities desired are actually present. Each commodity should be studied before a package is constructed for it. Nor is the nature of transportation always the

same. Packages for foreign service are subjected to severer hazards than those shipped to domestic markets and should be protected accordingly.

**22. Quality and Condition of Lumber.**—Boxes should be manufactured from lumber that is sound (free from decay) and well seasoned. The average moisture content of

**TABLE I**  
**EFFECT OF MOISTURE CONTENT ON STRENGTH OF BOXES**

Conditions as to Moisture	Strength Relation Per Cent.
Nailed and tested at once at 15 per cent. moisture. . . . .	100
Nailed and tested at once at 30 per cent. moisture. . . . .	90
Nailed at 15 per cent., tested at 5 per cent. moisture, 4 months storage. . . . .	75
Nailed and tested at once at 5 per cent. moisture. . . . .	50
Nailed at 30 per cent. moisture, tested at 5 per cent. moisture, 1 year in storage. . . . .	15
Nailed at 5 per cent. moisture, tested at 35 per cent. moisture, stored 2 weeks in exhaust steam. . . . .	10
Nailed at 5 per cent. moisture, dried at 4½ per cent. moisture, tested at 35 per cent. moisture, 2 weeks in dry storage, 2 weeks in steam. . . . .	10
Nailed at 5 per cent. moisture, steamed at 35 per cent. moisture, tested at 4½ per cent. moisture, 2 weeks in steam storage, 2 weeks in dry storage. . . . .	10

the wood should be from 12 to 18 per cent., based on the weight of the wood after it has been oven-dried. Table I shows the effect on the strength of the box caused by the moisture condition of the lumber and the change of moisture condition in storage.

Lumber should be free from knot holes and loose or rotten knots. Knots whose diameters exceed one-third the width of the board, measured as in Fig. 17, should not be permitted, and no knots should be permitted which interfere with the proper nailing of the box.

**23. Weight and Interchangeability of Woods Commonly Used for Boxes.**—The results of the drum tests, combined with the data developed by thousands of tests on many species of woods under varying conditions of locality, state of dryness of the wood, weight, hardness, shock resisting ability, resistance to nails, tendency to split, etc., as well as by tests of the holding power of the various sizes and kinds of nails, screws, strapping, and the like, have made it possible to group the woods generally used in packing boxes into four groups, such that, in a general way, any wood in one group can be substituted for any other wood in the same group and built into a box of the same specifications with practically the same results in commercial service. These groups are given in Table II, which also gives the average weight of the various species of woods, in pounds per square inch surface measure, of various thicknesses of box lumber, air-dried, having an approximate moisture content of from 12 to 15 per cent. based on weight of the wood after oven-drying.

**24. Thickness of Lumber for Boxes.**—Where woods of Groups 1 and 2 having a thickness of  $\frac{1}{2}$  inch or less are used, woods of Groups 3 and 4 of  $\frac{7}{8}$  inch less thickness may be substituted. Where the thickness of woods of Groups 1 and 2 is more than  $\frac{1}{2}$  inch and not more than 1 inch, woods of Groups 3 and 4 having  $\frac{1}{8}$  inch less thickness may be employed.

**25. Width of Lumber for Boxes.**—No piece of less than  $2\frac{1}{2}$  inches face width should be used in any part of a box except cleats. Any part of a box that is 6 inches or less in width should be one-piece stock.

**26. Joining.**—All parts of a box which are of two pieces or more should be tongued and grooved, except ends, which may be butt jointed and fastened with not less than three corrugated fasteners, two driven from one side and one from the opposite side, or cleated. Cleats should be not less than 2 inches wide and of the same thickness as the sides, tops, and bottom.



TABLE II

WEIGHT OF WOODS USED FOR PACKING-BOXES. WOOD  
AIR-DRIED, MOISTURE CONTENT, 12 TO 15 PER CENT.

Kind of Wood	Thickness, Inches							
	$\frac{7}{8}$	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{1}{4}$
<i>Group 1</i>	Pounds Per Square Inch Surface Measurement							
White pine.....	.014	.013	.012	.0098	.0078	.0059	.0049	.0039
Norway pine.....	.017	.016	.015	.012	.0098	.0074	.0061	.0049
Aspen.....	.014	.013	.012	.0098	.0078	.0059	.0049	.0039
Spruce.....	.014	.013	.012	.010	.0081	.0060	.0050	.0040
Western yellow pine.....	.013	.012	.011	.0094	.0075	.0056	.0047	.0038
Cottonwood.....	.015	.014	.013	.010	.0084	.0063	.0052	.0042
Yellow poplar.....	.014	.013	.012	.010	.0081	.0060	.0050	.0040
Balsam fir.....	.013	.012	.011	.0094	.0075	.0056	.0047	.0038
Chestnut.....	.015	.014	.013	.011	.0087	.0065	.0054	.0043
Sugar pine.....	.014	.013	.012	.0098	.0078	.0059	.0049	.0039
Basswood.....	.013	.012	.011	.0094	.0075	.0056	.0047	.0038
Cypress.....	.017	.016	.015	.012	.0098	.0074	.0061	.0049
Willow.....	.014	.013	.012	.010	.0081	.0060	.0050	.0040
Noble fir.....	.014	.013	.012	.010	.0081	.0060	.0050	.0040
Magnolia.....	.018	.016	.015	.013	.010	.0076	.0063	.0051
Buckeye.....	.013	.012	.011	.0091	.0072	.0054	.0045	.0036
White fir.....	.013	.012	.011	.0094	.0075	.0056	.0047	.0038
Cedar.....	.016	.015	.013	.011	.0090	.0067	.0056	.0046
Redwood.....	.013	.012	.011	.0091	.0072	.0054	.0045	.0036
Butternut.....	.014	.013	.012	.0098	.0078	.0059	.0049	.0039
Cucumber.....	.017	.016	.015	.012	.0098	.0074	.0061	.0049
Alpine fir.....	.012	.011	.010	.0083	.0067	.0050	.0041	.0033
Lodgepole pine.....	.015	.014	.013	.010	.0084	.0063	.0052	.0042
<i>Group 2</i>								
Southern yellow pine.....	.020	.019	.017	.015	.012	.0087	.0072	.0058
Hemlock.....	.015	.014	.013	.010	.0084	.0063	.0052	.0042
Virginia and Carolina pine.....	.020	.018	.017	.014	.011	.0085	.0071	.0057
Douglas fir.....	.017	.016	.014	.012	.0096	.0072	.0060	.0048
Larch.....	.019	.017	.016	.013	.011	.008	.0067	.0054
<i>Group 3</i>								
White elm.....	.017	.016	.015	.012	.0098	.0074	.0061	.0049
Red gum.....	.018	.016	.015	.013	.010	.0076	.0063	.0051
Sycamore.....	.018	.016	.015	.013	.010	.0076	.0063	.0051
Pumpkin ash.....	.019	.017	.016	.013	.011	.0080	.0067	.0053
Black ash.....	.018	.017	.016	.013	.010	.0078	.0065	.0052
Black gum.....	.018	.017	.016	.013	.010	.0078	.0065	.0052
Tupelo.....	.019	.017	.016	.013	.011	.0080	.0067	.0053
Maple, soft or silver..	.017	.016	.015	.012	.0098	.0074	.0061	.0049
<i>Group 4</i>								
Hard maple.....	.022	.020	.019	.016	.013	.0095	.0080	.0064
Beech.....	.022	.020	.019	.016	.013	.0095	.0080	.0064
Oak.....	.023	.022	.020	.017	.013	.010	.0083	.0067
Hackberry.....	.019	.017	.016	.013	.011	.008	.0067	.0053
Birch.....	.022	.020	.019	.016	.012	.0093	.0078	.0062
Rock elm.....	.023	.021	.020	.016	.013	.0098	.0081	.0065
White ash.....	.019	.018	.016	.014	.011	.0082	.0069	.0055

### THE NAILING OF BOXES

**27. Importance of Proper Nailing.**—The purpose of nailing a box is to hold it together and give it rigidity. To use more nails or larger nails than are necessary to accomplish this purpose is a waste of both material and labor. To use fewer nails than are necessary to hold the box together properly under ordinary conditions of transportation or use will result in breakage of the box and damage to whatever it may contain.

Laboratory tests and observation of packages in transit and at their destination have shown conclusively that where the nailing is insufficient, the package cannot be improved by putting in heavier lumber. Observation has shown also that the majority of failures in ordinary boxes are due, not to the lumber but to the nailing. It is also evident that in many instances a better package could be obtained with much thinner material by the use of a few more nails.

In arriving at the proper nailing there are a number of factors that must be considered. These are the nail, its length, diameter, and surface, and the species of wood, its thickness, and condition.

**28. Holding Power of Nails.**—Experiments to determine the holding power of cement-coated, plain, and barbed nails were made by testing a standard 7-penny (written 7d) nail driven to a depth of 1 inch in dry wood. The holding power, in pounds per nail, is given in Table III.

**TABLE III**

**HOLDING POWER OF 7D NAILS, IN POUNDS PER NAIL**

Kind of Wood Used in Box	Kind of Nails		
	Cement Coated	Plain	Barbed
Longleaf pine.....	225	140	110
Basswood.....	133	82	70
Beech.....	430	400	335



The results of these tests show that, at least in the ordinary sizes, barbed nails are not so efficient in box construction as are plain smooth ones. Apparently the ability of the barbs to increase the resistance of the nail to withdrawal is more than offset by their tendency to tear the wood. Cement-coated nails have given uniformly better results than smooth nails, although different lots of cement-coated nails have shown greater variation in efficiency than smooth nails. The holding power of the cement-coated nail is from 10 to 50 per cent. greater than that of the same-size smooth nail. On an average, a box built up with the cement-coated nails will withstand about one and one-half times as much rough handling as a box made with the same number and gauge of smooth nails.

**29. Length and Diameter of Nails.**—Since the length of the nail rather than the gauge seems to be the principal factor in its holding power, and as nails are likely to split the wood, it usually is desirable to use nails of as small gauge as can be driven in nailing machines.

If the nail is short and is driven into soft wood, the weaving of the box in transportation and the shocks due to rough handling will cause the nail to work back and forth to its full length in the wood and come loose almost immediately, notwithstanding the fact that it may be of comparatively heavy gauge.

If the nail is very slender it will not drive well, and the longer it is the greater must be its diameter in order to insure that it will drive. If a very slender nail is driven to considerable depth in a piece of hard wood, the shocks of transportation and handling will bend the nail between the two planks of the box and it may fail by breaking off rather than by pulling out.

The diameter of a nail should be great enough so that it may be driven easily, which is usually the limiting factor, but should not be so small that it will break in use. It should be such that with the weaving of the package in transportation and the shocks of handling it will not be bent and will not work back and forth to its full depth in the wood. The proper balance is reached when there is an equal likelihood of the wood failing or of the nails breaking off or pulling out.

As a rule, the head of the nail is too small, and failure of the box occurs because the head is pulled through the sides. With the larger heads made in accordance with the ordinary practice, the metal is too thin and the head breaks off. It is thought that a much better nail can be made than is being produced at the present time. The proper sizes of nails for different thicknesses and species of wood will be treated further on.

**30. Driving of Nails.**—Nails should be driven flush with the wood, and should never be overdriven. Overdriving causes the fiber of the wood to be broken under the heads, often to such an extent that no holding power is left in the wood. The first strain on the box then causes the wood to pull away from the nails. The evil effect of overdriving nails is greater in thin material than in thick, but in any box overdriving is bad practice and should be guarded against.

**31. Effect of Different Woods on Nailing.**—The kind of wood of which a box is made is of importance, since each species has certain characteristics of weight and hardness that indicate its ability to hold nails, its strength, and its likelihood of splitting, and thus determine the proper thickness of material and size and spacing of nails.

The most significant difference in the various species of wood is in their dry weight. A piece of lumber of very light weight has but little wood substance. All wood substance is of practically the same weight and the weight of a piece of dry lumber, when free from resinous material, is an indication of the amount of wood substance it contains. It will be evident, therefore, that without sufficient wood substance it is impossible to have strength or nail-holding power, and that the more wood substance there is in a species of wood the greater its strength and nail-holding power are likely to be.

In Fig. 18, which is a chart issued by the Forest Products Laboratory, is shown the number of pounds required to pull a nail driven into the side grain of woods of different densities or specific gravities. The numbered dots represent the different kinds of woods tested, and from their positions on the chart the density of the dry wood may be read on the bottom line,

and on the left-hand side, the holding power of a nail driven into it.

The woods corresponding to the numbers on the chart are as follows: 1, White cedar; 2, Cottonwood; 3, Engleman spruce; 4, Black cottonwood; 5, Basswood; 6, White fir; 7, Aspen;

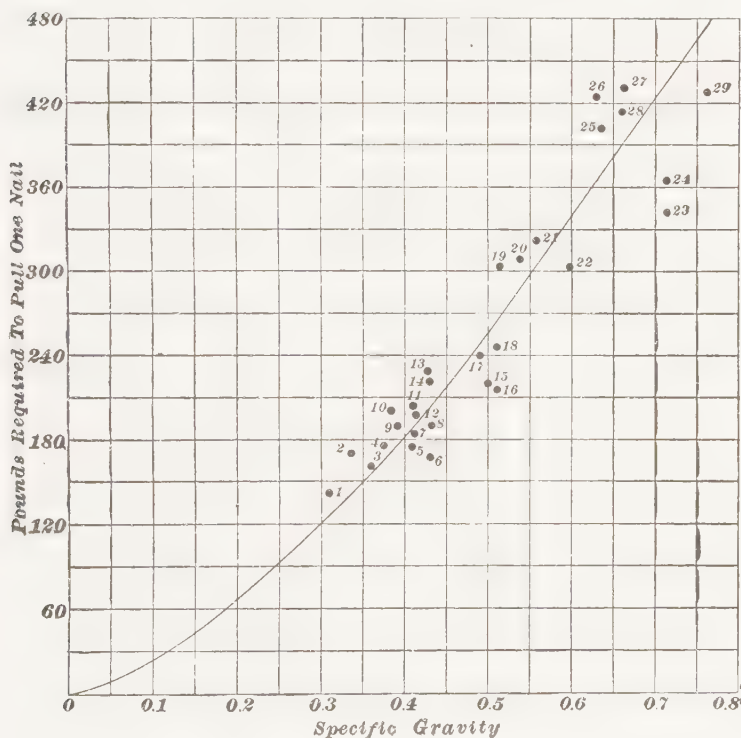


FIG. 18

8, Western yellow pine; 9, White spruce; 10, White pine; 11, Red spruce; 12, Yellow poplar; 13, sap Gum; 14, Jack pine; 15, Hemlock; 16, Norway pine; 17, heart Gum; 18, Loblolly pine; 19, Soft maple; 20, Elm; 21, Sycamore; 22, Longleaf pine; 23, Oak; 24, Locust; 25, Ash; 26, Hard maple; 27, Beech; 28, Birch; 29, Honey locust.

It should be understood that in practically all kinds of wood the resistance to withdrawal is greater if the nail is driven into

the side grain than if driven into the end grain. There also may be considerable difference in density and holding power of different specimens of the same species of wood.

The curve in Fig. 18 shows that in general the heavier species hold nails much better. As a rule, all the strength properties of wood increase with the weight. When a nail is driven into a piece of dense wood a much greater splitting force is pro-

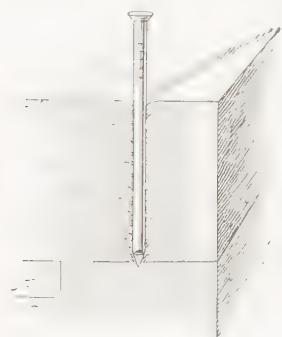


FIG. 19

duced than when the same nail is driven into a piece of soft wood. Dense wood, however, has greater resistance to splitting than has light wood. These two factors, therefore, tend to counterbalance each other, but do not do so entirely. The dense species, as a rule, will split somewhat more than will the lighter species, with the same number of nails.

The firmness with which the grain is interlocked and other species characteristics are important factors in determining the resistance to splitting.

**32. Effect of Condition of Wood on Nailing.**—Green wood is much softer than dry wood, and nails can be driven in and withdrawn from green much more readily than from dry wood.

The moisture content of green wood may vary from 30 to 200 per cent. of the dry weight, depending on the species and on conditions of growth. As the wood dries, it first loses the free water in the cells and afterwards that from the cell walls. When the water begins to leave the cell walls, the wood begins to shrink in both width and thickness but not materially in length. This causes the fibers, which are bent down along the nail as shown in Fig. 19, to shrink away from the nail in the direction of the end grain, in which direction the nail was being most firmly held in the first place. Thus the nail that has been driven into green material that has afterwards dried, is held only by two sides. The weaving action during transportation

will readily cause nails so held to come loose and work out of the box without any rough handling, and the boxes will not stand more than 10 per cent. as much rough handling as those nailed when the lumber contains 15 per cent. moisture and is kept in practically that condition.

A nail driven into dry wood that afterwards is allowed to become soaked and then dried will act as does a nail driven into green lumber.

Boxes made of lumber in the proper moisture condition will stand ordinary storage without any appreciable loss in the ability of the nail to hold.

The effect of overdriving nails is to reduce their resistance to withdrawal, the proportionate reduction probably being greater in the case of dry wood than in green.

**33. Thickness of Material and Size and Spacing of Nails.**—In box making, consideration should be given not only to the kind of nails and the nature of the wood, as has been explained, but also to the thickness of the wood and the spacing of the nails.

The size of the nails to be used is determined by the thickness and the species of the wood in which the *points* of the nails are held after they are driven.

The ends of the boxes must be of such thickness that the nails will not run out under ordinary conditions. The nails must be small enough in diameter so that they will not cause splitting of the material. The tendency of the wood to split is increased with decreased spacing. The spacing, then, must not be so close as to cause splitting.

**34.** In Table IV are shown the sizes of standard cement-coated box nails to be used when sides, tops, or bottoms are to be nailed to ends or cleats of different thicknesses and of woods of different groups. In these groups, which are given in the table, the woods commonly used in box making are classified according to their nail-holding qualities. If the size of nail designated in the table is not available the next lower penny may be used and the nails spaced proportionately closer. The data given in the table are the results of experiments and many

TABLE IV

**SIZES OF CEMENT-COATED NAILS TO BE USED WITH  
WOODS OF VARIOUS GROUPS**

With Woods of:	Thickness (Inches) of Ends or Cleats to Which Sides, Tops, and Bottoms Are Nailed							
	$\frac{3}{8}$ or less	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$ or $\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$
	Size of Nails To Be Used							
Group 1 . . .	4d	5d	5d	6d	7d	8d	8d	9d
Group 2 . . .	4d	4d	5d	5d	6d	7d	7d	8d
Group 3 . . .	3d	4d	4d	5d	5d	6d	7d	7d
Group 4 . . .	3d	3d	4d	4d	4d	5d	6d	7d

WOODS COMMONLY USED IN MANUFACTURE OF BOXES,  
GROUPED ACCORDING TO NAIL-HOLDING QUALITIES

Group 1			Group 2	Group 3	Group 4
Alpine fir	Cottonwood	Redwood	Douglas fir	Black ash	Beech
Aspen	Cucumber	Spruce	Hemlock	Black gum	Birch
Balsam fir	Cypress	Sugar pine	Larch (Tamarack)	Maple, Soft or silver	Hackberry
Basswood	Jack pine	Western yellow pine	Southern yellow pine	Pumpkin ash	Hickory
Buckeye	Lodgepole pine	White fir	Virginia and Carolina pine	Red gum	Maple, hard
Butternut	Magnolia	White pine		Sycamore	Oak
Cedar	Noble fir	Willow		Tupelo	Rock elm
Chestnut	Norway pine	Yellow poplar		White elm	White ash

observations, from which the following conclusions have been derived:

**35.** In using slender, or box, nails in woods of medium hardness, as those of Group 3 of Table IV, the "penny" of the nail should not be greater than the thickness, in eighths of an inch, of the wood that holds the point of the nail. For example,

if the sides of a soft maple box are nailed to ends that are  $\frac{1}{2}$ , or  $\frac{3}{8}$  inch thick, the size of the nails should not be larger than fourpenny (abbreviated 4d).

For the softer woods, as those in Groups 1 or 2 of Table IV, nails may be one penny larger and sometimes even two pennies. For the hard woods, as those in Group 4, nails one penny and sometimes two pennies smaller should be used.

The ordinary box machine, when nailing boxes of the sizes commonly used for canned foods, cannot space the nails close enough to cause splitting of the ends or to develop the strength of the lumber.

**36.** For the **spacing of nails** in boxes to be used for domestic shipments, the following arrangement has been suggested:

Sixpenny or smaller nails held in the side grain should be spaced 2 inches apart, and for the same nail in the end grain the spacing should be  $1\frac{3}{4}$  inches. For larger nails, the spacing should increase  $\frac{1}{4}$  inch for each penny of size over six. To a great many persons, this spacing will appear to be too close, since it gives many more nails than have formerly been used. As a matter of fact, however, it is only about two-thirds of the number that can be put in before excessive splitting of the ends is encountered, and is only about two-thirds of the number required to balance fully the strength of the box in other respects. Therefore, even with this spacing, the nailing is still the weakest point of the ordinary box.

No board should have less than two nails at each nailing end. Nails holding tops and bottoms to sides may be 6 inches or more apart when the nails are 6-penny or smaller, the spacing increasing 1 inch for each penny over 6,

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#### SUBSTITUTES FOR WOOD

**37.** The question often arises as to whether to use wood or some substitute for wood such as fiberboard, pulpboard, or corrugated strawboard for the construction of containers. Containers made of wood substitutes are to a considerable extent



recognized as furnishing effective packages. For example, the Consolidated Freight Classification provides that ratings applicable on articles in wooden packages will apply on those articles when packed in containers made of substitutes, provided certain technical requirements are met. These requirements relate to the thickness of the materials used, the ability of the material to meet a specified amount of resistance, the weight of the contents of packages, etc. The express companies also provide for the handling of shipments in this kind of containers.

Manufacturers of this kind of packages as well as those of wood are equipped to give complete information and make researches if necessary to determine how the individual shipper can make use of their products. A number of manufacturers of packages have laboratories for this service which are equipped along the lines of the Forest Products Laboratory for testing cases, materials, etc.

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## INTERIOR PACKING

### **38. Protection of Fragile and Delicate Contents.**

Much of the trouble with packing boxes and damaged contents is due to the use of wrong methods of packing inside the box or to carelessness in applying otherwise good methods.

Many commodities that must be shipped are easily damaged by moisture, breakage, dirt or odors.

Moisture may be guarded against by lining the package with a water-resisting paper or by use of a water-tight sheet-metal lining. When such linings are used, the space they take up must be provided for when the box is designed.

For the protection of fragile articles, some sort of cushioning material must be provided that will prevent the shocks received by the box from being transmitted to the breakable contents.

Materials commonly used for such packing are corrugated fiber and straw board, excelsior, straw, hay, shavings, and sawdust. The fragility of the commodity packed and the roughness of the handling to which the package is likely to be subjected will determine largely the kind of such materials required and the space they must occupy in the package.

It is of first importance that the articles be so packed that they cannot move about within the package so as to strike against the box or one another; and plenty of cushioning material should be used at the corners to guard against shocks resulting from the falling of the box on its corners.

**39.** For very fragile articles, when the package is likely to receive rough handling, a method of packing called *floatation* is used. In this method, the article is carefully packed in a box or other container, which is then packed in another larger box, the space between the two being tightly filled with cushioning material; or sometimes the interior box is held in place by a system of mechanical spring supports.

**40.** The various parts of the contents of some boxes require separation to prevent their jolting against one another. One method of accomplishing this is to use a series of cells or individual compartments for each separate part of the contents.

The character of the material composing the cell will be determined by the nature of the articles to be packed. Some articles require protection from surface abrasions only, and it is then that the cushioning property is desired in the cell walls. For other articles, much strength may be needed in the cell walls, as the contents may not be strong enough to withstand the pressures which occur within the container. Whatever material the cells are made of, the dimensions of the box should be such as to cause the contents to fit snugly. This diminishes the force of the impacts that tend to destroy both the cells and the container, and also allows the total displacement of the container to be as small as possible.

Tests have demonstrated that cells made from corrugated fiber board of good quality are more efficient for cushioning small comparatively heavy articles than wooden cells made from  $\frac{5}{16}$  inch lumber. The wooden cells broke up sooner and absorbed less shock than the corrugated fiber-board cells; consequently, the wood transmitted the shocks of the contents to the container itself and thereby promoted its destruction.

The more fragile and delicate parts of some commodities must be separated from the stronger parts by partitions of con-

siderable strength. Sometimes the amount of packing material in a box may be reduced and a more satisfactory container obtained by the use of one or more partitions. Partitions may be placed horizontally as well as vertically and also may be left unfastened to facilitate removal.

**41.** In the shipment of some articles, trays for support may be used to advantage. These trays may be constructed of plywood or lumber. Plywood is made of thin veneerlike sheets of wood usually glued together with the grain of one sheet crossing that of the other. If lumber is used, it is sometimes well to put splines in the ends of the trays to prevent splitting and to decrease the warping. There is much less change in the size and shape of symmetrically constructed plywood than of lumber when these materials are subjected to change in moisture content. It may sometimes be desirable to use sheet metal or wall board for trays.

If several articles of varied shape with some delicate parts attached are packed in the same box, a series of internal braces, supporters or separators must be designed. Good examples of such boxes are those for carrying valuable tools, scientific instruments and machines.

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### PACKING TO PREVENT PILFERAGE

**42.** Pilferage has always been a serious factor in export shipping and it has grown to be important in domestic traffic. The losses are greatest in connection with goods that are of personal use and the units of which can be carried off easily, such as canned goods, cigars, liquors, clothing and shoes for both men and women, toilet articles, hardware, etc.

To guard against pilferage of foreign shipments, the packages are made extra strong, often of tongue-and-groove stock, strongly bound with metal straps about the ends and often around the middle.

For domestic shipments, it is common practice to use cases sufficiently strong for ordinary safety in transportation and to trust to safety clips of various kinds, metal straps, etc., to make

the package difficult to open. In many cases a wire is drawn tightly around the middle of the package and securely fastened. In some cases, comparatively light wires are used and the ends

fastened with a seal so that the package cannot be opened without leaving evidence that it has been tampered with.

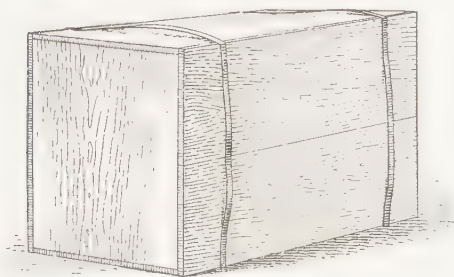


FIG. 20

for additional strength, care should be taken that the lumber is seasoned; for if it is green, it may shrink until the metal straps become loose as shown in Fig. 20, and they will then be of but little effect.

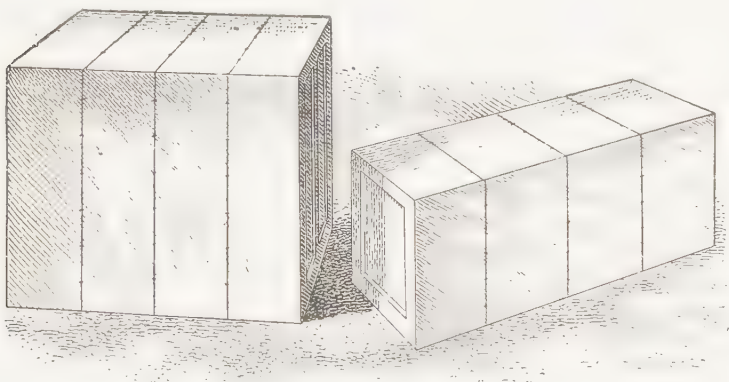


FIG. 21

There are a number of kinds of metal strapping in use. The kind that is most commonly used, and which is as good as any, is a thin flat band of cold-rolled unannealed steel, coated to prevent rust. This is fastened by driving nails through it. Single or twisted wire straps are also used for certain purposes. There are also forms of patented nailless straps and wires. Each of

these forms of straps is of value if used with care and judgment to suit the conditions that are to be met. No form of strapping will of itself insure complete protection of stealable goods, but strong cases and proper strapping tightly stretched and well nailed will reduce pilferage to a minimum.

**44.** Though strapping is generally something added to a package to give increased protection, there are some forms of packages in which wires are depended on to furnish a large part of the necessary strength. Two packages constructed in this manner are shown in Fig. 21. Packages of this kind are made for a great variety of articles and have given satisfaction in use.

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## MARKING OF FREIGHT

**45. How to Mark Freight.**—The regulations of the transportation companies as to how freight shall be marked are very plain, as is shown by the following rules from the Consolidated Freight Classification.

Each package, bundle or loose piece of freight must be plainly, legibly and durably marked by brush, stencil, marking crayon (not chalk), rubber type, metal type, pasted label, tag, or other method which provides marks equally plain, legible and durable, showing the name of only one consignee, and of only one Station, Town or City and State to which destined.

When consigned to a place of which there are two or more of the same name in the same State, the name of the County must also be shown.

When consigned "To Order," it must be so marked, and further also be marked with the name of the station at which consignee will accept delivery.

When consigned "To Order," it must be so marked, and further marked with an identifying symbol or number which must be shown on shipping order and bill of lading.

It would seem that little comment on the foregoing rules would be necessary. It is a fact, however, that many losses and delays of freight are caused by insufficient or incorrect marking. Therefore, a few of the precautions that should be taken and some of the errors to be avoided will be mentioned.

**46.** First of all, marking should be large enough to be readily seen and plain enough to be easily read. The use of a stencil in marking is advisable, and on shipments to some foreign countries is required by their customs regulations.

In addition to the marking required by the rules of the carriers, it is generally desirable that the shipper's name and address shall appear on packages, although there are cases where it is not desired to give this information to the consignee. Unless there are positive objections to making this information known, the shipper's name should be shown on the package, for use in case a shipment has been improperly addressed or is refused, or unclaimed.

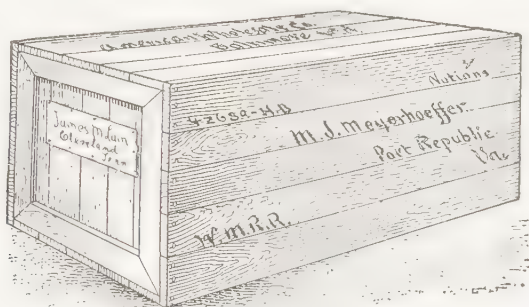


FIG. 22

Failure to show *complete* addresses on shipments is a prolific source of trouble. A very prevalent form of this failure is in not showing street addresses on shipments to towns or cities of considerable size. An actual instance was a shipment delivered to a transportation company addressed to Box 199, New York. Delay, if not actual loss, is liable to result from the use of such an address in shipping to a city of several million inhabitants and covering many square miles of territory. It is safer to put on a street address when it is not needed than to risk leaving it off when it is needed.

**47.** A very common error in marking is the giving of the right city address but the wrong state. The names of many well-known towns and cities are duplicated in different states;



for example, there are 15 Burlingtons, 16 Mt. Vernons, and hundreds of other cities and towns are duplicated a greater or less number of times. An error in address by which a package was directed to a state that did not contain a city of the name shown in the address would probably be detected before the shipment started on its journey, because it would be directed to a destination that did not exist. But a shipment intended for Burlington, N. J., if it were marked Burlington, Iowa, would go forward as directed, and the first that would be heard from it would be notice that it could not be delivered because the consignee could not be located.

**48. Removal of Old Marks.**—At the other extreme from the insufficiently addressed package is the one bearing too many addresses. The cause of too many addresses on a package is in most cases the violation of one of the rules of the Consolidated Freight Classification, which reads "Old consignment marks must be removed or effaced."

Fig. 22, taken from a photograph, shows a condition that has been known to happen. On this box are three addresses, one of which was the right one and the other two were left from former shipments. Only the consignor could tell which was right.

When there are too many addresses, disagreeing marks will probably first come to notice at some point where the property is transferred from one road or one car to another, and this point may be many miles from the point of shipment. Then the best that can result will be a loss of time while the correct information is being secured. In many instances, however, no questions will be asked and the shipment will go forward to the destination that is on the side of the package visible to those doing the transferring, and this destination may or may not be the correct one.

Shippers often blame the transportation companies for accepting shipments with improper marks, but it is generally impracticable for the freight receiver to make a detailed inspection of all sides of every package in a shipment to see if the shipper has done what he should have done as a matter of self-protection.



**49.** That the failure to remove old marks may cause troubles other than in connection with the destination is illustrated in Fig. 23, the history of which is briefly as follows:

A merchant used a second-hand container in returning *seasonable* merchandise to the manufacturer, and did not remove the old marks "Furs, value \$2,000." The express company offered this shipment for delivery with charges based on this valuation, although the contents were not worth \$50. The consignee refused to pay the charges based on the \$2,000 valua-

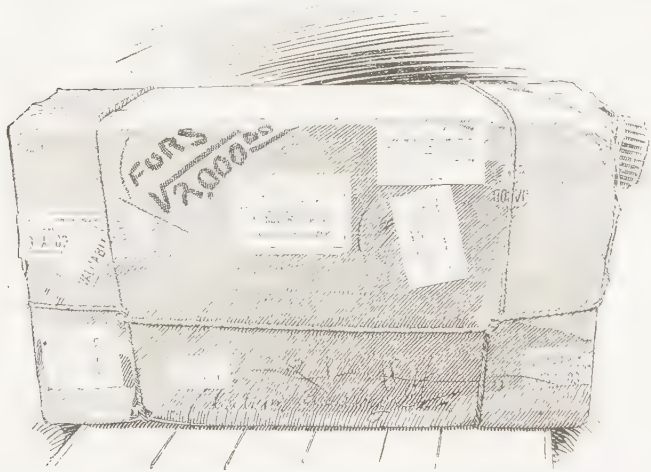


FIG. 23

tion, and by the time the true valuation was established the season for the merchandise in the package was over and it then had no value.

From the two illustrations just given, it will be plain that it is a wise rule to see that there is no more and no less information on packages than should be there, and that what is there is correct. A careful inspection of the marking of shipments, especially where second-hand packages are used, will be time and effort well spent.

**50. Marking in the Wrong Place.**—That good packing of a shipment may be offset by putting marks in the wrong

place on the package is illustrated in Fig. 24. The package shown is one especially constructed for the transportation of inverted-light globes with a cushioning air space of  $1\frac{1}{2}$  inches at the top and bottom, but with a space of only  $\frac{1}{2}$  inch at the sides.

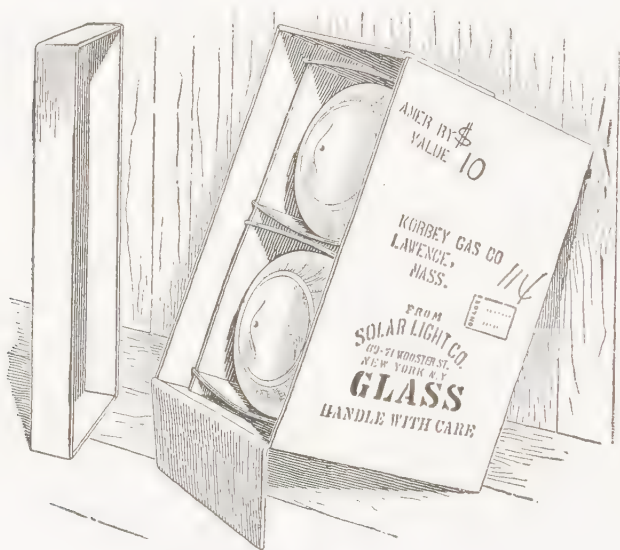


FIG. 24

The natural effect of marking the shipment on the side, will be that the package will be laid on the side where there is only the  $\frac{1}{2}$  inch air cushion. In other words time and money expended in providing a special package are offset by marking in the wrong place.

# SPECIAL FREIGHT SERVICES

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## NATURE AND PURPOSE OF SPECIAL SERVICES

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### KINDS OF SERVICES

**1.** Ordinary freight service is characterized by comparatively slow movement and irregular schedules. In addition to such routine service, however, the carrier of freight performs many special services, which are included in the following three classes: (1) The speeding up, or expediting, of the regular transportation service to meet permanent or temporary needs in connection with certain traffic. (2) Services not directly involved in moving the property between two points, but which are closely connected with such movements. (3) Other services performed, which are not transportation services, but which are essential on account of the nature of certain commodities or of trade practices in connection with these commodities.

**2.** The first mentioned class of services includes the expedited service provided in connection with the transportation of livestock, refrigerated products, and other articles, which, on account of their nature, must be moved in the fastest possible time. In addition to the traffic where speed is essential in order to avoid deterioration, shrinkage, etc., expedited service is

accorded other traffic, as conditions may justify. For example, fast service may be given even to such a non-perishable product as hardware, as a matter of accommodation, when the shipper shows the need of quick delivery to meet a rush order.

**3.** Examples of the second class of service are found in such services as switching, demurrage, reconsignment, etc. At first glance, it may not seem that demurrage is a special service. The service, however, consists in allowing the use of the railway equipment for a longer than usual time. Since the carriers need their equipment to use, the charge is usually made high enough so that shippers and consignees will hold cars no longer than is necessary.

**4.** Services of the third class are those which are provided because the carriers recognize that certain commodities are of such a nature that they cannot be moved directly from point of origin to final destination, but must be stopped in transit for the performance of some manufacturing or other necessary process. Thus grain is stopped in transit to be ground into flour before it is forwarded to its ultimate destination. In this class of service the property involved often goes out of the possession of the carrier while undergoing the process for which it is stopped in transit. For this reason carriers have developed systems of insuring the legitimate use of these services at times when the property is out of their possession in privately owned elevators or elsewhere.

**5.** The charges for the special services mentioned depend largely on conditions. Some services are performed without charge; for others, a nominal charge is made, and for others the charge is based on cost of service plus a reasonable profit. The application of the charges will depend on circumstances. For example, it is to be supposed that the carriers take expedited service into consideration in establishing rates on such commodities as refrigerated products; but a carload of hardware expedited by special arrangement would not pay any increased rate, though it might get the same service as refrigerated products or other traffic that pays a much higher rate.

Again, the consignee may have to pay switching charges on one carload and not on another; because, in the one case the carrier who performed the transportation service pays the switching charge, while in another case the consignee is required by tariff provisions to pay the charges.

The best advice that can be given relative to the use of special services of all kinds is that the tariffs governing them should be very carefully studied with a view to ascertaining definitely, not only the rates, but all the conditions under which the services are performed. It is particularly true of the second and third classes of services mentioned, that the tariffs governing them are local in their application, as in the case of switching charges, which are generally published to apply within some limited area known as switching limits. For this reason the charges for such services vary in different places.

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## EXPEDITED SERVICE

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### FREIGHT TRAINS RUN ON SCHEDULES

**6.** One of the most important improvements in freight service is the placing of freight transportation on something near to a definite schedule, so that the consignee can obtain a fairly good idea as to how long it will take him to get his freight after it has been shipped.

In their efforts to get deliveries on dependable schedules the railroads have developed what are known as *symbol* trains. These trains operate from certain terminals regardless of the amount of freight that may be available each day, in contrast with what are sometimes designated as *tonnage* trains, which are trains that are operated only when there is a specified amount of tonnage available. The operation of trains on regular schedules enables the shipper at a point like New York to plan with a reasonable degree of certainty that his freight will go forward on a certain day and to figure how long it will be in arriving at its destination. Fig. 1, which is from an advertisement, shows the extent to which this service has been developed.

7. In addition to the trains that run on regular schedules for the handling of miscellaneous traffic, there are many trains that make both fast and regular time in the handling of livestock,

### FAST MERCHANDISE SERVICE FROM NEW YORK

#### TO POINTS ON ERIE RAILROAD:

Akron, O.....	3rd morning	Indianapolis, Ind.....	4th morning
Binghamton, N. Y....	1st afternoon	Jamestown, N. Y.....	2nd "
Buffalo, N. Y.....	2nd morning	Mansfield, O.....	3rd "
Chicago, Ill.....	4th "	Marion, O.....	3rd "
Cincinnati, O.....	4th "	Meadville, Pa.....	2nd afternoon
Cleveland, O.....	3rd "	Rochester, N. Y.....	2nd morning
Dayton, O.....	4th "	Salamanca, N. Y.....	2nd "
Elmira, N. Y.....	2nd "	Scranton, Pa.....	2nd "
Hornell, N. Y.....	2nd "	Youngstown, O.....	3rd "

#### TO IMPORTANT WESTERN POINTS:

Denver, Col.....	9th morning	Pittsburgh, Pa.....	4th morning
Detroit, Mich.....	3rd "	Portland, Ore.....	14th "
Hamilton, Ont.....	3rd "	San Francisco, Cal..	14th "
Kansas City, Mo....	6th "	St. Louis, Mo.....	4th "
Los Angeles, Cal..	13th "	St. Paul, Minn....	6th "
Milwaukee, Wis....	5th "	Seattle, Wash.....	14th "
Minneapolis, Minn..	6th "	Sioux City, Iowa...	6th "
Omaha, Neb.....	6th "	Toledo, O.....	4th "
Peoria, Ill.....	5th "	Toronto, Ont.....	3rd "

SPECIAL—To eliminate transfer of freight by trucks in Chicago and Cincinnati, through cars are loaded daily to platforms of western and southern railroads thereby giving traffic the benefit of through car service operated by them.

FIG. 1

fruits, vegetables, fish, dairy products, etc. The development of this service has enabled us to know that we may expect to have not only necessary eatables but luxuries, with a promptness and regularity not thought possible a few years ago. A few of the many examples of the benefits of this service are found in the fact that the New Yorker may have for his breakfast fish that was caught not many hours before off the coast of New

England, or the seller of livestock may figure with reasonable certainty that his livestock will be in Chicago in time for a market held at a certain hour in the day.

#### USE OF PACKAGE CARS

8. The developing of expedited service has not been confined to carload traffic, although much of the freight that requires such service moves only in carloads. The principal method adopted to secure faster movement of small lots of freight has been to reduce the number of transfers to which such freight must be subjected. This reduction in the number of transfers has been effected by operating through cars over two or more roads, instead of transferring the contents of the car every time the freight is transferred from one road to another. The operation of these *through package cars*, as they are called, gives the shippers two of the benefits of carload movement: (1) The fast time accorded carload shipments; (2) the freedom from transfers which is a characteristic of carload freight. The latter benefit not only saves time but it also reduces loss and damage to the freight transported.



FIG. 2

9. While through cars are not available from all points of origin to all points of destination, an effort should be made to make use of such cars as far as conditions permit. Where it is not possible to get a shipment to destination in one through car, it may be possible to utilize two such cars, and get better service than would be obtained by using one through car and two or more local cars where transfers have to be made. For example, as shown in Fig. 2, a shipment might be moving from point *a* to point *d* via junction points *b* and *c*. If local cars were used, it might be necessary to transfer the freight from one car to another at junctions *b* and *c*. On the other hand, there might be a through car from *a* to *d* or from *a* to *c*, and another from *c* to *d*. In the first case, two transfers would be eliminated, and in the latter case, one transfer,



In view of the savings that are possible through the use of through package cars, it is well for the shipper to find out just what cars are being operated in the territory to which he ships. The traffic departments of roads serving the point of origin are glad to give full information about any through cars that they have. Where information is desired about cars on other lines, it may be secured by writing to the general traffic departments, or by communicating with one of the many "off-line" offices which all the larger roads in the country maintain at important points. Thus the shipper at Boston who wants information about conditions on some western road will probably find a representative of that road right in his own city.

**10.** There is a difference of opinion among traffic men as to how far the operation of package cars can be developed to serve points for which there is not always a large amount of traffic. For example, there is always a profitable amount of tonnage from New York for such points as Chicago, but such is not always the case for points farther west. The logical result of an attempt to operate package cars where the amount of traffic is limited, will be either that the cars will move with an unprofitable amount of tonnage, or they will not go forward at sufficiently short intervals to give the benefit of expedited service. A plan that is considered more practicable by many industrial and railroad traffic men is to operate package cars as far as there is profitable tonnage, or to some important transfer point where tonnage for points beyond can be joined with other tonnage that has accumulated at the transfer point. Thus tonnage for points beyond Chicago can be loaded in the Chicago car, and at Chicago it can be reloaded into through cars for western points. The railroads are giving attention to the matter of developing the service in the way to give the quickest service rather than attempting to see how many through cars they can put into operation. In other words, if the operation of a car over the originating line in connection with the operation of a car over another line will give better results than the operation of a through car over the two lines, the service will be developed in that way,

### SERVICE WITH SPECIAL EQUIPMENT

**11. Refrigerator Cars.**—Certain kinds of traffic not only require expedited service, but the use of special equipment, and perhaps the use of artificial heat or cold to preserve the contents of cars in transit. One example of this class of traffic is found in connection with traffic which is broadly classified as refrigerated products; that is, fruits, vegetables, dairy products, packing-house products, and other commodities, which during all, or part of the year, have to be moved in refrigerator cars which are kept cool by use of ice and sometimes ice and salt.

Some features of this service in addition to the speed and protection required are as follows:

1. Refrigerator cars are owned by the railroad companies only to a limited extent. One of the reasons for this condition is that the demand for this class of equipment is, for the most part, not continuous so far as any one road or section of the country is concerned. For example, there is a heavy demand for refrigerator cars for hauling the California fruit crops when those crops are moving to market, but the demand in that section is light at other times. For similar reasons, it is more desirable to have the Pullman Company provide sleeping and other special types of passenger cars rather than for each road to undertake to meet an irregular demand for these cars.

In the case of refrigerator and other special types of cars, the situation has been met by shippers and other private organizations providing the equipment. The meat packers have for some time past provided refrigerator cars, not only for the transportation of their own commodities, but for the use of other shippers who have rented cars from the packers. This development in the ownership of cars has served to bring about a distribution of cars where they are needed.

2. The railroads pay the owners of privately owned equipment on the basis of so much per mile for every mile that the car moves over their lines, loaded or empty. In other words if a shipment is hauled 1,000 miles and the car is returned to the point of origin, the railroad would pay the owner of the car for a movement of 2,000 miles.

3. The railroads are not authorized to use cars for the movement of loads without authority from the owners of the cars. The owners of cars will, however, generally allow the car to be loaded with clean freight when it is to move toward the home of the car, for a loaded car generally moves faster than an empty one.

4. While most of the refrigerated traffic moves in privately owned equipment, there are some railroads such as the New York Central and the Sante Fe, and some others, that own a considerable number of refrigerator cars.

5. Transportation charges do not usually include the cost of ice and salt, but most railroads undertake to furnish them and make a charge for them in addition to the charges for transportation. If the tariffs under which this traffic moves provide for the furnishing of ice and salt, the railroads are held responsible for carrying out shippers' instructions under those tariffs, and for the exercise of some judgment beyond those instructions when conditions arise which the shipper could not have foreseen when he gave the instructions. For example, there are sometimes considerable delays in making deliveries to consignees after cars have reached terminals, and it would generally be the duty of the railroad to see that cars were kept properly iced before delivery, although the shipper's instructions may not have specifically covered this phase of the movement.

In order to hold the railroads liable for failure to keep cars properly iced, it is necessary that the shipper shall give explicit instructions as to this matter. If it is desired that cars shall be reiced at all points where there are facilities for icing, the bill of lading must so state. Such instructions as "reice when necessary" are not definite, and it will be very difficult, if not impossible to collect a claim when instructions are given which cannot be interpreted with a reasonable degree of certainty by the employes of the railroad.

**12.** There are certain commodities that always move under the protection of ice, but others require such protection only at certain times in the year. Such commodities are often moved

during the winter months in refrigerator cars without any ice, or in cars having ventilators but no facilities for carrying ice. Traffic moving under such conditions, while not requiring the fast service that is necessary in summer, still needs reasonably fast service, as unseasonably warm weather may affect commodities that would be safe as long as average winter weather prevails.

**13. Heating.**—Another class of traffic that requires protection against normal temperature at certain times in the year is that which requires heat in winter, as in the case of potatoes. In most cases the shipper is required to install heating apparatus and send men along to keep up the fires. Much of this kind of traffic is moved in box cars with stoves installed. The need for expedited movement of such traffic lies in the fact that extremely low temperature and snow storms may injure the contents of the cars. Unlike the traffic that requires icing, special cars are not usually required, although ventilator cars are often used.

**14. Livestock.**—In the transportation of livestock, not only must the nature of the traffic itself be taken into consideration, but also state and federal laws. Some of the features connected with this kind of transportation are as follows:

1. Animals are liable to lose weight and deteriorate in other ways while in transit.

2. Because livestock is so often sold in markets that are held on certain days and at certain times in the day, it is essential that it shall be transported not only quickly but regularly.

3. There are state and federal laws that have a direct bearing on transportation; one such requirement is that livestock shall be released from cars after it has been on the road a certain number of hours.

4. Special cars are generally required. A prevalent type is a car with slatted sides and ends to allow a free circulation of air. In the case of certain kinds of smaller animals, provision is made for loading the cars on two levels, in what is known as double-deck cars.

5. A great deal of livestock is loaded in solid trains. The prevalence of this type of movement is recognized in the making of rates upon trainload lots, while rates upon other kinds of traffic are seldom based upon units larger than carloads.

6. A livestock contract takes the place of the bill of lading, (as the receipt and contract of shipment) which is used for practically all other kinds of traffic.

**15.** Other classes of traffic receive special treatment from the railroads, as physical or business conditions require. The shipper who has, or may have, traffic requiring special treatment of any kind will find the traffic departments only too glad to give information about existing or possible services. There has never been a time when the traffic departments of the railroads were more anxious to meet the needs of the patrons than at the present.

To secure information relative to special services, in most cases it is best to get in communication with the general traffic departments of the railroads, rather than try to do business with local freight agents. With the exception of a few agents in larger cities, their knowledge is limited to those things that directly affect their station. As a rule the traffic manager, general freight agent, or division freight agent is the man who can tell or find out what is wanted.

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## DIVERSION AND RECONSIGNMENT

**16. Definition and Explanation.**—Conditions often arise that make it desirable or necessary for the shipper to change or add to the shipping instructions given when a shipment leaves its point of origin. For example, fruits and vegetables are often loaded and started toward a certain section of the country when the shipper does not know at just what point in that section of the country a market will be found, as markets on such commodities fluctuate according to supply, demand, price, etc. Diversion and reconsignment privileges make it possible to send shipments where the best market obtains, within certain limitations.

While the terms *diversion*, and *reconsignment* originally had different meanings, they are now used interchangeably and include the following: (a) Change in the name of consignee; (b) change in the name of the shipper; (c) change in the destination; (d) change in the route; (e) any other change which requires a change in the records or in the movement of the car.

Unless special provision were made for such cases, the effect of the changes enumerated, especially change in destination or route, would be that the shipper would have to pay one set of charges from the point of origin to the point where the new instructions became effective, and another charge from the latter point to the destination, and the sum of these charges would be materially higher than the through rates from the original point of origin to the final destination. In case of such change of route, etc., diversion and reconsignment privileges allow a considerable amount of freedom in getting shipments where they are wanted; for by paying the carrier for extra expense incurred in making changes from the original billing instructions (either clerical expense or the cost of additional movement of cars), the car is delivered at final destination with the same charges as though it had originally started for that destination.

**17.** In many cases the carriers have definite points where provision is made for handling changes in instructions, or where final instructions may be given when complete instructions were not given when the shipment started on its way. Potomac Yard, near Washington, D. C., is recognized as a point where changes in or additions to billing instructions on fruits and vegetables from the south will be taken care of, as the cars pass there on their way north. Likewise, there are certain points in New York State where final instructions may be given in regard to hay from the West, when such instructions have not previously been given. While the definitely established points for handling reconsignment matters are of material importance in connection with this privilege, it is not to be overlooked that the privilege is all the time being exercised at whatever points an emergency may dictate. For example, cars



of grain may be started to a certain Atlantic port, but before they have gone very far it may appear that a much lower ocean rate can be secured through some other port. In such case the shipment may be diverted or reconsigned with financial advantage if it is possible to catch the cars in time.

**18. Procedure in Diverting or Reconsigning.**—In making use of diversion and reconsignment privileges, quick action is necessary, particularly if the need for exercising the privileges arises after the shipment is well on its way. Some of the many things that may take place during a few hours are: (1) The shipment may have passed the last junction point where the diversion to the new destination can take place; (2) the shipment may have passed out of the possession of the carriers into the hands of the original consignees; (3) the carrier may not be able to locate the shipment and stop it before the original instructions have been carried out.

Application for diversion or reconsignment may be made to the originating carrier or to the carrier in whose possession the shipment is. At the time of application, it will be necessary to surrender the bill of lading, so that it may be endorsed or a new one given in exchange, or to file a bond of indemnity to the road making the reconsignment. This matter is usually arranged through the originating carrier. Freight and other charges will have to be paid or guaranteed to the carrier performing the reconsignment; these charges may include demurrage, track storage, switching, and charges for reconsignment services.

When it is desired to make changes in shipping instructions the shipper must exercise his knowledge and judgment as to how to get the best and quickest results. While some time may be saved by communicating direct with the carrier in whose possession the shipment is known to be, it may also be necessary to work through other carriers at the same time. For example, if a shipment has passed out of the possession of the originating line and is known to be on a certain connecting line, a request by telegraph may be made to the connecting line to make the desired change, while the bill of lading and other necessary



papers are lodged with the representative of the originating line which will notify the other carrier that the change should be made. This will often serve to expedite action, as the carrier having possession of the shipment will proceed on the word of the initial carrier when it would not act on the word of a shipper, who might be entirely unknown.

**19. Liability of Carrier for Failure to Carry out Instructions.**—In connection with diversion and reconsignment matters, the question frequently arises as to the liability of the carrier for failure to carry out instructions. While the circumstances in the individual case would often be the determining factor, it is generally held that if the carrier undertakes to make the desired change it must exercise reasonable efforts to carry out the instructions.

For example, if reconsignment orders were lodged with the carrier 24 hours before the shipment reached the reconsignment point, the carrier would probably be held liable in case of failure to carry out instructions. If, however, the instructions were received by the carrier when the car was in the train ready to move to its original destination, it is not likely that the carrier would be held liable for damages if the change was not made, particularly if the train was one that is operated on a regular schedule. It is often impossible to get a car out of a train that is made up.

**20. Rules.**—Following are given the rules governing a considerable portion of the traffic that is handled under diversion or reconsignment privileges. It should be understood that these are shown only for the purposes of example, and not for use in the handling of shipments, as such rules are liable to change at any time.

#### RULES AND CHARGES GOVERNING THE DIVERSION OR RECONSIGNMENT OF CARLOAD FREIGHT

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##### APPLICATION

Freight in carloads, except as provided below, may be diverted or reconsigned on this company's lines, subject to the following rules, regulations and charges.

If request is made for the diversion or reconsignment of freight, in carloads, this company will make diligent effort to locate the shipment and effect diversion or reconsignment, but will not be responsible for failure to effect the diversion or reconsignment desired unless such failure is due to the negligence of its employees.

The term "switching limits" as used in these rules means all locations within the recognized switching limits of all carriers serving the billed destination, and not merely the switching limits of the carriers receiving the road haul movement.

#### DEFINITION

For the purpose of applying these rules, the term "Diversion" or "Reconsignment" means:

- (a) A change in the name of the consignee;
- (b) A change in the name of the consignor (see rule 6);
- (c) A change in destination (see rule 5);
- (d) A change in route at the request of consignor, consignee, or owner;
- (e) Any other instructions given by consignor, consignee or owner necessary to effect delivery which requires a change in billing or an additional movement of the car, or both (see Section (f) of Exceptions).

#### CONDITIONS

The services herein authorized are subject to the following conditions:

- (a) That shipments have not broken bulk.
- (b) Orders for diversion or reconsignment will not be accepted under these rules at or to a station or to a point of delivery against which an embargo is in force. Shipments made under authorized permits are not subject to the condition.
- (c) On "straight" consignments the original bill of lading should be surrendered or other proof of ownership established. On shipments consigned "to order", original bill of lading should be surrendered for indorsement or exchange, or in its absence satisfactory bond of indemnity executed in lieu thereof, or other approved security given at the time the diversion or reconsignment order is placed.
- (d) Request for diversion or reconsignment must be made or confirmed in writing.
- (e) *Prepayment or Guarantee of Charges.*—All charges accruing under these rules must be paid or guaranteed to the satisfaction of the carrier by the person or persons requesting the diversion or reconsignment or reforwarding before shipments are forwarded.

#### EXCEPTIONS

*These rules will not apply to:*

- (a) Ex-lake grain from lake ports or ex-lake rates.
- (b) Grain, hay, straw, or grass and field seeds held or stopped for official inspection.

(c) Fresh or green fruits; fresh or green vegetables (including potatoes and onions); fresh berries and melons.

(d) Coal and coke (not including petroleum coke).

(dd) Freight at Eastern Seaboard Terminals, viz.; New York, N. Y., for which other tariffs are provided (see Tariff I. C. C. No. 16120, P. S. C.—2 N. Y. No. 4635, G. O. 2160 or subsequent issues.)

*No charge will be made:*

(e) For a single diversion or reconsignment if order for such diversion or reconsignment is received at initial billing point before car leaves the yard at such initial billing point, provided the change involves no extra movement of the car.

(f) Where a car is placed for delivery at destination, and an order for the delivery of the contents thereof to other than the billed consignee is or has been presented to and accepted by the agent of this company at destination, and no change is involved in billing records, nor additional movement of car required.

(g) Where a change in route is made necessary by embargo placed against the billed destination or route thereto subsequent to acceptance of the shipment by carrier at point of origin.

#### RULES

*Rule 1. Transfers and waybills* covering shipments which have been diverted or reconsigned under these rules should bear separate notation stating where and when the diversion or reconsignment was effected, and charges if any were made.

*Rule 2. Freight Rate Applicable.*—These rules and charges will apply whether shipments are handled at local rates, joint rates, or combination of intermediate rates. The through rate to be applied under these rules is the rate from point of origin via the diversion, reconsigning or reforwarding point to final destination in effect on date of shipment from point of origin. If the rate from original point of shipment to final destination is not applicable through the point at which the car is diverted, reconsigned or reforwarded, in connection with this line, the Tariff rates in effect to and from the diversion, reconsigning or reforwarding point will apply, plus diversion or reconsigning charges.

*Rule 3. Demurrage and Track Storage Rules.*—Freight stopped, diverted, reconsigned or reforwarded under these rules will in addition be subject to demurrage and track storage charges lawfully in effect at point where stopping, diversion, reconsignment or reforwarding is accomplished.

*Rule 4. (a) Application.*—The rules published herein, governing the diversion or reconsignment of freight are applicable while the freight is in possession of this company, also when it has reached billed destination on this line and has been delivered to switching road for placement.

(b) *Switching Charges Additional.*—If diversion or reconsignment is made after arrival of car at billed destination and the car has been delivered to a connecting road, all switching charges of connecting road will be in addition to any other charge named herein.

(c) *Diversions or Reconsignments Beyond Rails of This Company.*—When diversion or reconsignment is requested after shipment has passed out of possession of this Company, or when request is received too late for this Company to effect the change desired, such request will be transmitted to direct connecting carrier to which shipment was delivered, when the responsibility of this Company will end; and the shipment will be subject to rules of the carrier on whose rails the diversion or reconsignment is accomplished (except as per Section (a) of this rule).

*Rule 5. (a) Only one change in destination* will be permitted to this Company under these rules, except as provided in Section (b), and then only provided the car has not had a previous change in destination after leaving the initial billing point.

(b) If the consignor, consignee, or owner requests a subsequent change necessitating movement of the car, the shipment will be treated as a reshipment from point of reforwarding and will be charged at the tariff rate therefrom plus \$7.00 per car.

(c) If a car is stopped short of billed destination after it has had one diversion or reconsignment under these rules, charges will be made on basis of the tariff rates to and from the point at which the first diversion or reconsignment was accomplished plus seven dollars (\$7.00) per car in addition to the other diversion or reconsignment charges previously accrued.

*Rule 6. Change in Name of Consignor.*—The charge for a change in the name of consignor with no further change in billing instructions will be \$1.50 per car, except as provided in Exceptions (e).

*Rule 7.—Diversion or Reconsignment in Transit.*—If a car is diverted or reconsigned in transit prior to arrival at original destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$3.00 per car will be made for such service.

*Rule 8-A. Stopping in Transit.*—If a car is stopped for orders for the purpose of delivery or diversion or reconsignment or reforwarding prior to the arrival at original billed destination, or if such destination is served by a terminal yard, then prior to arrival at such terminal yard, on request of consignor, consignee or owner, the following charges will be made for the service: \$3.00 per car; and the point where the car is stopped will be considered the destination of the freight. If the car is subsequently forwarded from the point at which held, the provisions of rules 9, 10, 11 or 12, as the case may be, will also be applied. The

service of stopping as provided in this rule will not prevent one change of destination under the provisions of rule 5.

*Rule 8-B. Notifying Consignee of Cars Held at Holding Point.*—If, after arrival at destination or if such destination is served by a terminal yard, then after arrival at such terminal yard, a car is withheld from placement on request of consignor, consignee or owner, no charge will be made for such service but the point at which held will be considered the destination of the freight and the party upon whose order the car is held will be notified at the post-office address designated by him. If the car is subsequently, placed for unloading, or is reforwarded from the point at which held, the provisions of rules 9, 10, 11, 12, and 13, as the case may be, will also be applied. The service of withholding from placement as provided in this rule will not prevent a change of destination under the provisions of rule 5 nor prevent a diversion or reconsignment under the provisions of rule 11.

*Rule 9. Changed at Destination on Orders Given Before Arrival.*—If order for diversion or reconsignment is placed with local freight agent at billed destination or other designated officer, in time to permit instructions being given to yard employes prior to arrival at such billed destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$3.00 per car will be made for such service.

*Rule 10. Diversion or Reconsignment to Points Outside Switching Limits Before Placement.*—If a car is diverted, reconsigned or reforwarded on orders placed with local freight agent or other designated officer after arrival of car at original destination, but before a placement for unloading, or if the original destination is served by a terminal yard, then after arrival at such terminal yard, a charge of \$7.00 per car will be made if car is diverted, reconsigned or reforwarded to a point outside of switching limits of original destination.

*Rule 11. Diversion or Reconsignment to Points Within Switching Limits Before Placement.*—A single change in the name of consignee at destination and (or) a single change in or a single addition to the designation of his place of delivery at destination will be allowed:

(a) Without charge, if order is received in time to permit instructions to be given yard employes prior to arrival of car at destination, or if the destination is served by a terminal yard, then prior to arrival at such terminal yard.

(b) At a charge of \$3.00 per car if such orders are received in time to permit instructions to be given to yard employes within twenty-four (24) hours after arrival of car at destination, or if the destination is served by a terminal yard, then within twenty-four (24) hours after arrival at such terminal yard. (See Note.)

(c) At a charge of \$7.00 per car if such orders are received subsequent to twenty-four (24) hours after arrival of the car at destination, or if the destination is served by a terminal yard, then subsequent to twenty-four (24) hours after arrival at such terminal yard. (See Note.)

NOTE.—In computing time, *Sundays and Legal Holidays* (national, state and municipal) will be excluded. (When a legal holiday falls on Sunday, the following Monday will be excluded.)

*Rule 12. Diversion or Reconsignment to Points Outside Switching Limits After Placement.*—If a car has been placed for unloading at original billed destination and reforwarded therefrom without being unloaded, to a point outside of the switching limits, it will be subject to the published rates to and from the point of reconsignment, plus seven dollars (\$7.00) per car reconsignment charge, except that in no case shall the total charge be less than the charge based on the through rate from point of origin to final destination, plus \$7.00 per car reconsignment charge.

NOTE.—If a car has been placed for unloading on a public delivery track, but has not been unloaded or accepted by consignee or owner, it will be subject to rule 10.

*Rule 13. Diversion or Reconsignment to Points Within Switching Limits After Placement.*—Cars that have been placed for unloading and which are subsequently reforwarded without being unloaded to a point within the switching limits of the billed destination will not be subject to diversion or reconsignment charge, but will be subject to the switching or local rate in addition to the rate from point of origin to billed destination.

*Rule 14. Only one reconsignment will be permitted, namely:*

(a) If reconsignment order is received in time to permit instructions to be given to yard employes prior to arrival of shipment at billed destination, or if such billed destination is served by a terminal yard, then prior to arrival at the terminal yard, a charge of \$3.00 per car will be made for this service.

(b) If reconsignment order is received in time to permit instructions to be given to yard employes within twenty-four (24) hours after arrival of car at destination or if destination is served by a terminal yard, then within twenty-four (24) hours after arrival at such terminal yard, a charge of \$7.00 per car will be made for this service.

(c) When not reconsigned as above, any order for reconsignment, diversion or reshipment will subject the freight traffic to the sum of local rates to and from points of reconsignment plus \$7.00 per car.



## DEMURRAGE AND STORAGE

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### DEMURRAGE

**21. Charges and Their Assessment.**—Cars and boats are built for the purpose of transporting freight and not for storage purposes. To insure, as far as possible, their use for transportation, charges are made to those who delay beyond a stated time in loading or unloading vehicles, and such charges are known as demurrage. While demurrage charges for cars amount to only a few dollars per day at the most, the charge may run up into hundreds of dollars per day for boats, depending upon the kind and size of the boats.

There is perhaps no charge assessed by the transportation companies which causes more friction with receivers and shippers of freight than do demurrage charges. This is due in part to the fact that those who pay these charges do not realize that the purpose of the charges is to secure to the carriers the use of their equipment for its proper purposes. It is true that a majority of shippers now use their best efforts to get cars unloaded on time, but there are still some who would treat cars as moving warehouses, and because of these there have been increases in car demurrage charges, and additional penalties on specified kinds of traffic.

**22. Demurrage Rules.**—After many years of efforts on the part of the carriers, shippers, and the Interstate Commerce Commission, demurrage rules that are nearly nation-wide have been provided, as shown in the following pages.

It will be noted that rule 1 specifically refers to certain conditions under which these rules will *not* apply and rule 2 provides that individual carriers may make exception where conditions warrant it.

As a special effort has been made in compiling these rules to make them definite, and easy of understanding, no detailed explanation is required, but a careful study of them should be made in connection with any specific situation. A study of



these rules will show that it is not intended that they shall be interpreted upon the basis of mere technicalities. For example, rule 4 states that where a car has been partly unloaded before the arrival notice is received, the removal shall be considered as an arrival notice. In other words, a consignee may not show that he knows the car has arrived, by unloading some of the contents, and then turn around and say that he did not know that the car had arrived until he received the arrival notice.

**23.** Shippers and consignees are often unable to load or unload cars for reasons beyond their control, and they feel that they should not be made to pay any demurrage in such cases. A study of rule 8 will show that the carrier is usually entitled to collect demurrage where it was not responsible for the delay in loading or unloading, except in certain specified situations of unusual weather conditions. Attention is especially called to that portion of rule 8 which deals with the matter of arrival notices.

**24.** Concerns handling any considerable number of cars will find in the average agreement, dealt with in rule 9, an opportunity to reduce their demurrage bills. There are some features of this rule to which especial attention is called: (1) Only one credit can be earned on one car; (2) not more than four credits can be applied against debits on one car; (3) credits earned on cars unloaded cannot be used on cars loaded, or vice versa; (4) each month's business is complete in itself, that is, credits earned in one month cannot be applied in another month; (5) the benefits of the Average Demurrage Agreement can be secured only by entering into the agreement.

**25.** The rules here reproduced are included in Demurrage Tariff No. 4 issued by Agent J. E. Fairbanks, 431 South Dearborn St., Chicago, Ill. It is recommended that those who have occasion to deal with demurrage charges secure a copy of the latest issue from him, as this tariff, like all tariffs, is subject to change from time to time.

Rule

Subject

## NATIONAL CAR DEMURRAGE RULES AND CHARGES

**Note.**—The disposition at point of detention determines the purpose for which a car is held and the rule applicable thereto, except where there is specific tariff provision to the contrary.

**Section A.**—Cars of either railroad or private ownership, held for or by consignors or consignees for loading, unloading, forwarding directions or for any other purpose (including cars held for loading company material unless the loading is done by the railroad for which the material is intended and on its tracks) are subject to these demurrage rules, except as provided in Section B.

**Section B.**—The following cars are not subject to these demurrage rules:

1. Cars under load with company material for use of and consigned to the railroad in whose possession the cars are held.

2. Cars under load with live stock. This exemption does not include cars held for or by shippers for loading live stock. Live poultry will not be considered live stock.

3. Empty cars placed for loading coal at coal mines, coal mine sidings, coal washers, or coke at coke ovens and such cars under load with coal, at such mines, mine sidings or coal washers, or with coke at coke ovens. This exemption applies only at mines, coal washers and ovens which are subject to car distribution rules in lieu of demurrage rules.

4. (a) Private cars on private tracks when the ownership of the car and track is the same.

**Note.**—Private cars while held under constructive placement for delivery upon the tracks of their owners are subject to demurrage charges after expiration of forty-eight hours' free time. (See Rules 5 and 9.)

## DEFINITIONS

**Private Car.**—A car having other than railroad ownership. A lease of a car is equivalent to ownership. Private cars must have the full name of the owner or lessee painted or stenciled thereon or must be boarded with full name of owner or lessee. If name of lessee is painted, stenciled or boarded on car then the car is exempt from demurrage for the lessee only. If name of lessee is not painted, stenciled or boarded on the car then the car is exempt from demurrage for the owner only.

**Private Track.**—A track outside of carrier's right of way, yard, and terminals, and of which the carrier does not own either the rails, ties, roadbed, or right of way; or a track or a portion of a track which is devoted to the purposes of its user either by lease or written agreement.

(b) Empty private cars stored on railroad or private tracks, including such cars sent by the owner to a shipper for loading, provided the cars have not been placed or tendered for loading on the orders of a shipper. (See Rule 6, Section D.)

CARS SUBJECT TO RULES

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued
2	FREE TIME ALLOWED	<p><b>Section A.</b>—Forty-eight hours' (two days) free time will be allowed for loading or unloading all commodities. See Rule 2, Section B, Paragraph 4.)</p> <p>"LOADING" includes the furnishing of forwarding directions on outbound cars.</p> <p>"UNLOADING" includes:</p> <p>(a) Surrender of bill of lading on shipments billed "to order."</p> <p>(b) Payment of lawful freight charges when required prior to delivery of the car.</p> <p>(c) Furnishing of a "turn-over" order (an order for delivery to another party) after car has been placed for delivery and no additional movement of the car is made.</p> <p>When the same car is both unloaded and reloaded, each transaction will be treated as independent of the other. This will also apply to industries performing their own switching service, in which case the industry must notify the carrier date and time car was unloaded.</p> <p>When a car held for loading or unloading is moved by railroad or private power to another point in the same yard or industry to complete loading or unloading, only forty-eight hours' free time will be allowed, except that when the railroad makes a charge for such movement the time incident thereto shall not be computed against the car.</p> <p>(See Rule 7, Note 2.)</p> <p><b>Note.</b>—If a consignee wishes his car held at any break-up yard or a hold-yard before notification and placement, such car will be subject to demurrage. That is to say, the time held in the break-up yard will be included within the 48 hours of free time. If he wishes to exempt his car from the imposition of demurrage he must either, by general orders given to the carrier or by specific orders as to incoming freight, notify the carrier of the track upon which he wishes his freight placed, in which event he will have the full 48 hours' free time from the time when the placement is made upon the track designated. This "Note" will apply except when in conflict with Rule 2, Section B, Paragraph 1.</p> <p><b>Section B.</b>—Twenty-four hours' (one day) free time will be allowed:</p> <p>1. When cars are held for reconsignment, diversion or reshipment, or held in transit on order of consignor, consignee or owner.</p> <p><b>Note.</b>—This will not apply to cars subject to Rule 2, Section B, Paragraph 3.</p>

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
2—Continued	FREE TIME ALLOWED—Continued	<p>The term “diversion” or “reconsignment” will be applied as defined in the reconsignment tariffs of this railroad, except that under this rule when a car is placed for delivery at destination a “turnover” (or order for delivery to another party) which does not involve an additional movement of the car is not a reconsignment. (See Rule 2, Section A.)</p>	
		<p>A reshipment is the making of a new contract by which under a new rate the original lading, without being unloaded, is forwarded in the same car to another destination.</p>	
2—Continued	FREE TIME ALLOWED—Continued	<p>2. When cars, destined for delivery to or for forwarding by a connecting line, are held under tariff regulations for surrender of bill of lading or payment of lawful freight charges.</p>	
		<p>3. When cars are held in transit and placed for inspection or grading, including reconsignment or other disposition orders. At stations where grain and hay must be inspected or graded, the consignee agreeing with the carrier in writing for file at the station, to accept the bulletining of the cars as due and adequate notice of arrival, the bulletins must be posted by 9:00 a. m. of each day, showing the previous twenty-four (24) hours' receipts, and the free time (twenty-four hours) is to be calculated from the first 7:00 a. m. thereafter. Where there is no agreement for bulletining of cars, the free time must be calculated from the first 7:00 a. m. after the day on which notice of arrival is sent or given to the consignee.</p>	
2—Continued	FREE TIME ALLOWED—Continued	<p><b>Exception:</b>—At Chicago, Ill., and Kansas City, Kan.-Mo.: On all grain held in transit, subject to Federal or State inspection, and on seeds (field or grass), grain screenings or seed screenings, held in transit, subject to recognized Official inspection, free time for disposition will expire at 6:00 p. m. of the day that inspection is reported by the inspection authorities on or before 11:00 a. m. No additional free time will be allowed for reinspection or appeal. The bulletin form of notice may be used in lieu of written notice of arrival to the consignee.</p>	
		<p><b>Exception:</b>—At St. Paul, Minneapolis, Minnesota Transfer, Camden Place, Duluth, West Duluth, Minn., Superior, Superior East End, Central Ave. (Superior), Allouez or Itasca, Wis.: On all grain subject to Federal or State Grain Inspec-</p>	

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
2—Concluded	FREE TIME ALLOWED—Concluded	<p>tion received on or before 8:30 a. m., and upon which notice of arrival is given by 9:00 a. m., disposition shall be given not later than 4:00 p. m., the same day, provided inspection is reported to the office of the Federal or State Grain Inspector before 11:00 a. m. When a reinspection is called before disposition is given, one day additional free time will be allowed, provided Local Freight Agent is notified of the call on day of inspection and a change in grade is allowed by the Federal or State Inspector. If no change in grade is allowed demurrage will be assessed, provided disposition is not furnished before 5:00 p. m. of the day car is first inspected. On all cars loaded with grain and inspected (if for inspection) prior to 6:00 p. m., disposition must be given not later than 4:00 p. m. the following day, excepting that where reinspection or appeal is called, and the grade is changed by Federal or State Inspector or Appeal Board, one additional day of free time shall be allowed.</p> <p>4. Except as otherwise provided in Rule 2, Section A, when cars are held to complete loading, or to partly unload.</p> <p><b>Note.</b>—When a car held for unloading is partly unloaded and partly reloaded, 48 hours' free time will be allowed for the entire transaction.</p> <p>5. On cars containing freight in bond for Customs entry and Government inspection.</p> <p><b>Section C.</b>—Cars containing freight for transshipment to vessel will be allowed such free time at the port as may be provided in the tariffs of the individual carriers lawfully on file with the Interstate Commerce Commission.</p>	
3	COMPUTING TIME	<p><b>Note.</b>—In computing time, Sundays and legal holidays (National, State, and Municipal), but not half holidays, will be excluded, except as otherwise provided in Section A of Rule 9. When a legal holiday falls on Sunday the following Monday will be excluded.</p> <p><b>Section A.</b>—On cars held for loading, time will be computed from the first 7:00 a. m. after placement on public-delivery tracks and without notice of placement, but if not placed within 24 hours after 7:00 a. m. of the day for which ordered, time will be computed from 7:00 a. m. after the day on which notice of placement is sent or given to consignor. (See Rule 6—Cars for Loading.)</p>	

Rule

Subject

### NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued

**Section B.—1.** On cars held for orders, surrender of bill of lading or payment of freight charges, whether such cars have been placed in position to unload or not, time will be computed from the first 7:00 a. m. after the day on which notice of arrival is sent or given to the consignee or party entitled to receive same. (See Rule 4—Notification.)

**Note.**—The time between receipt of order and placement of car (not to include the time attributable to the act or neglect of consignor or consignee) will be deducted from the total detention to the car.

**2.** Orders for disposition or reconsignment, when mailed, wired or otherwise transmitted by the reconsignor to agent of the carrier at point where cars are held, or to the agent of any carrier named in the bill of lading contract or participating in the transportation transaction, unless otherwise provided by tariff, will release cars at 7:00 a. m. of the date such orders are received by any such agent, provided they are sent or given prior to the date received.

Such orders mailed, wired or otherwise transmitted and received the same date, will release cars at the hour the orders are received by any such agent.

Date of mailing to be determined by the postmark.

**Note.**—When order releasing a car is sent to this railroad by U. S. mail and the order is not received by the addressee, the car shall be considered released as of the date the order should have been delivered, provided proof is furnished by the claimant that the order was deposited in the U. S. mail properly stamped and addressed on the date claimed.

**Section C.**—On cars held for unloading, except as otherwise provided in Section B, Paragraph 1, of this rule, time will be computed from the first 7:00 a. m. after placement on public delivery tracks, and after the day on which notice of arrival is sent or given to consignee or party entitled to receive same. If car is not placed within 24 hours after notice of arrival has been sent or given, time will be computed from the first 7:00 a. m. after the day on which notice of placement has been sent or given to the consignee or party entitled to receive same. (Sec Rule 4, Sections A and D.)

**2.** On cars subject to Rule 5, Section B, Paragraph 2, time will be computed from the first 7:00 a. m. after the day on which notice as required by Rule 5, Section B, Paragraph 1, is sent or given to the consignee or party entitled to receive same.

3—Continued

COMPUTING TIME—Continued

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
3—Concluded	COMPUTING TIME—Concluded	<p><b>Section D.</b>—On cars to be delivered on other-than-public-delivery tracks, time will be computed from the first 7:00 a. m. after actual or constructive placement on such tracks. Time computed from actual placement on cars placed at exactly 7:00 a. m. will begin at the same 7:00 a. m.; actual placement to be determined by the precise time the engine cuts loose. (See Rule 4, Section C, and Rules 5 and 6.)</p> <p><b>Note 1.</b>—"Actual Placement" is made when a car is placed in an accessible position for loading or unloading or at a point previously designated by the consignor or consignee. If such placing is prevented from any cause attributable to consignor or consignee and car is placed on the private or other-than-public-delivery track serving the consignor or consignee, it shall be considered constructively placed, without notice.</p> <p><b>Note 2.</b>—Any railroad track or portion thereof assigned for individual use will be treated as "other-than-public-delivery track."</p> <p><b>Section E.</b>—On cars to be delivered on interchange tracks of industrial plants performing the switching service for themselves or other parties, time will be computed from the first 7:00 a. m. after actual or constructive placement on such interchange tracks until return to the same or another interchange track. Time computed from the actual placement on cars placed at exactly 7:00 a. m. will begin at the same 7:00 a. m.; actual placement to be determined by the precise time the engine cuts loose. (See Rule 4, Section C, and Rules 5 and 6.) Cars returned loaded will not be recorded released until necessary billing instructions are furnished.</p> <p><b>Note.</b>—Where two or more parties take delivery from the same interchange track, or where the railroad company uses the interchange track for other cars, or where the interchange track is not adjacent to the plant and the industry uses the railroad's tracks to reach same, a notice of placement shall be sent or given to the consignee and time will be computed from the first 7:00 A. M. thereafter.</p>	
4	NOTIFICATION	<p><b>Section A.</b>—Notice of arrival shall be sent or given consignee or party entitled to receive same by this railroad's agent in writing or, in lieu thereof, as otherwise agreed to in writing by this railroad and consignee, within twenty-four hours after arrival of car and billing at destination, such notice to contain car initials and number, point of shipment, contents and if transferred in transit, the initial and number of original car. When address of consignee does not appear on billing, and is not known, the notice of arrival must be deposited in United States mail enclosed in a stamped en-</p>	



Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
4—Concluded	NOTIFICATION—Concluded	velope bearing return address, same to be preserved on file if returned. An impression copy shall be retained, and when notice is sent or given on a postal card the impression shall be of both sides. (See Rule 3, Sections B and C.) In case a car subject to Rule 3, Section C, is not placed on public delivery track within twenty-four hours after notice of arrival has been sent or given, notice of placement shall be sent or given to consignee.	
		<b>Note.</b> —When owner requests that original point of shipment be omitted on reconsigned cars, this information shall not be shown on notice of arrival at destination.	
		<b>Section B.</b> —When cars are ordered stopped in transit notice shall be sent or given the party ordering the cars stopped upon arrival of cars at point of stoppage.	
		<b>Section C.</b> —Delivery of cars upon other-than-public-delivery tracks or upon industrial interchange tracks, or written notice sent or given to consignee or party entitled to receive same, of readiness to so deliver, will constitute notification to consignee. (See Rule 8, Section D, Paragraph 1 (b).)	
		<b>Section D.</b> —In all cases where any part of the contents of a car has been removed by the consignee prior to the sending or giving of required notice, such removal shall be considered as notice of arrival.	
		<b>Section E.</b> —1. When carload freight is refused at destination, notice of such refusal shall, within 24 hours thereafter, be sent by wire to consignor, when known, at his expense, or when not known, to agent at point of shipment, who shall be required promptly to notify the shipper if known.	
		2. (a) When unclaimed perishable carload freight has not been disposed of within two days from the first 7:00 a. m. after the day on which notice of arrival has been sent or given to consignee, notice to that effect shall be sent by wire as provided in Paragraph 1 of this section.	
		(b) When other carload freight is unclaimed within five days from the first 7:00 a. m. after the day on which notice of arrival has been sent or given to the consignee, a notice to that effect shall be sent by wire as provided in Paragraph 1 of this section.	
		(See Rule 8, Section D, Paragraph 4.)	

Rule

Subject

### NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued

**Note.**—Under this rule the time of movement between hold point and destination, and any other time for which the railroad is responsible will not be computed against the consignee.

**Section A.**—1. When delivery of a car consigned or ordered to an industrial interchange track or to other-than-a-public-delivery track cannot be made on account of the inability of the consignee to receive it, or because of any other condition attributable to the consignee, such car will be held at destination or, if it cannot reasonably be accommodated there, at the nearest available hold point, and written notice that the car is held and that this railroad is unable to deliver will be sent or given to the consignee. This will be considered constructive placement. (See Rule 3, Sections D and E.)

2. On a car to be delivered to a switching line for final delivery and which consignee located on switching line is unable to receive and which for that reason the switching line is unable to receive from this railroad, notice will be sent or given the switching line showing point of shipment, car initials and numbers, contents and consignee and if transferred in transit the initials and numbers of the original car.

3. When this railroad is the switching line and, under conditions set forth in Paragraph 1, is unable to receive cars from a connecting line at destination for delivery within switching limits, upon receipt of notice from connecting line it will notify the consignee and put such cars under constructive placement. (See Rule 4, Section C.)

**Section B.**—1. When delivery cannot be made on specially designated public-delivery tracks, on account of such tracks being fully occupied, or from other causes beyond the control of this railroad, notice shall be sent or given the consignee in writing or, in lieu thereof, as otherwise agreed to in writing that delivery will be made at the nearest available point to the consignee, naming the point. Such delivery shall be made unless the consignee shall before delivery indicate a preferred available point, in which case the preferred delivery will be made.

2. In the event consignee or party entitled to receive shipment serves notice upon this railroad of refusal to accept delivery at the point named in notice sent or given in accordance with Paragraph 1, the car will be held awaiting opportunity to deliver on the specially designated track subject to Rule 3, Section C, Paragraph 2.

PLACING CARS FOR UNLOADING

Rule	Subject
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### NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued

**Section A.**—Cars for loading will be considered placed when such cars are actually placed or held on orders of the consignor. In the latter case the agent must send or give the consignor written notice of all cars which he has been unable to place because of condition of the other-than-public-delivery track or because of other conditions attributable to the consignor. This will be considered constructive placement. (See Rule 3, Sections D and E.)

**Section B.**—When empty cars placed on orders are not used in transportation service, demurrage will be charged from the first 7:00 a. m. after actual or constructive placement until released, with no free time allowance.

**Section C.**—Cars received from a switching line and held by this railroad for forwarding directions are subject to demurrage charges from the first 7:00 a. m. after they are received, until proper forwarding directions are furnished, with no free time allowance and without notice, except that cars received between 4:00 p. m. and 7:00 a. m. will not be subject to demurrage if forwarding directions are received prior to the following 12 noon.

2. Private cars which have been loaded on the tracks of their owners, received from such tracks and held by this railroad for forwarding directions, are subject to demurrage charges from the first 7:00 a. m. after they are received until proper forwarding directions are furnished, with no free time allowance and without notice.

**Section D.**—If an empty car is appropriated without being ordered, it shall be considered as having been ordered and actually placed at the time so appropriated. If not loaded outbound, such car is subject to Section B of this rule.

CARS FOR LOADING

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
7	DEMURRAGE CHARGES	<p><b>Section A.</b>—On cars not subject to Rule 9 (Average Agreement): After the expiration of free time allowed, the following charges per car per day, or fraction of a day, will be made until car is released:</p>	
		<p>For each of the first four days, \$2. For each succeeding day, \$5.</p>	
		<p><b>Section B.</b>—The charges on cars subject to average agreement are set forth in Rule 9.</p>	
		<p><b>Note 1.</b>—When through no fault of the consignor or consignee, the lading of a car is transferred by a carrier into two or more cars or when two small cars are furnished by a carrier in lieu of one large car ordered by the shipper, demurrage will be charged as for one car only, as long as any of such cars are detained beyond the free time.</p>	
		<p><b>Note 2.</b>—When a car contains two or more minimum carload shipments consigned to more than one consignee at the same station, demurrage will be charged the same as if the shipments had been received in separate cars and each consignee will be allowed a total free time of 48 hours (2 days) for unloading, free of interference by the other consignee or consignees.</p>	
		<p>(See Item 2, page 17 hereof for additional detention charges.)</p>	
8	CLAIMS	<p>No demurrage charges shall be collected under these rules for detention of cars through causes named below. Demurrage charges assessed or collected under such conditions shall be promptly canceled or refunded by this railroad.</p>	
		<p><b>CAUSES</b></p>	
		<p><b>Section A.</b>—Weather Interference.</p>	
		<p><b>Note.</b>—A consignor or consignee shall not be absolved from demurrage under Section A of this rule if, considering the character of the freight, others similarly situated and under the same conditions reasonably could and did load or unload cars during the same period of time.</p>	
		<p>1. When the condition of the weather during any part of the prescribed free time, (or the adjusted free time provided for in Section B of this rule) is such as to make it impossible for men or teams to work at loading or unloading, or impossible to place freight in cars, or move it from cars, without serious injury to the freight, or when, because of high water or snow drifts (see note) it is impossible, during the prescribed free time, to get to the cars for loading or unloading, the free time will be extended until a total of forty-eight hours (or twenty-four hours on cars subject to Rule 2, Section B, Paragraph 4) free from such interference shall</p>	

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
8—Continued	CLAIMS—Continued	<p>have been allowed. No additional time will be allowed unless claim, stating fully the conditions which prevented loading or unloading within the free time, is presented in writing to this railroad's agent within thirty days after the date on which demurrage bill is rendered.</p>	
		<p><b>Note.</b>—The extension of free time on account of high water or snow drifts shall apply to other-than-public-delivery tracks only where there is disability of this railroad.</p>	
8—Continued	CLAIMS—Continued	<p>2. When the lading is frozen while in transit so as to require more than forty-eight hours to remove it from the car, the total time actually expended by consignee in heating, thawing, or loosening and removing it will be considered as free time, but no allowance will be made for detention during the time that no effort is made to unload. This rule will not apply to shipments which are tendered in a condition to unload. Under this rule, consignee shall not be entitled to additional time unless, within the prescribed free time, he shall serve upon the railroad's agent a written statement that the lading was frozen when tendered.</p>	
		<p>3. No allowance on account of weather interference shall be made on cars subject to Rule 6, Section B.</p>	
8—Continued	CLAIMS—Continued	<p><b>Section B.</b>—Bunching.</p>	
		<p>1. Cars for loading. When, by reason of delay or irregularity in filling orders, cars are bunched and placed for loading in accumulated numbers in excess of daily placing as ordered, the shipper shall be allowed such free time for loading as he would have been entitled to had the cars been placed for loading as ordered.</p>	
8—Continued	CLAIMS—Continued	<p>2. Cars for unloading or reconsigning. When, as the result of the act or neglect of any carrier, cars originating at the same point or at intermediate points, moving via the same route and destined for one consignee, at one point, are bunched at originating point, in transit or at destination, and delivered by this railroad in accumulated numbers in excess of daily shipments, the consignee shall be allowed such free time as he would have been entitled to had the cars not been bunched, but when any car is released before the expiration of such free time, the free time on the next car will be computed from the first 7:00 a. m. following such release; provided, however, no allowance will be made unless</p>	

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
8—Continued	CLAIMS—Continued	claim is presented in writing to this railroad's agent within thirty days after the date on which demurrage bill is rendered and supported by statements showing date and point of shipment of each car.	
		<b>Section C.</b> —Demand of overcharge. When this railroad's agent demands the payment of transportation charges in excess of tariff authority.	
		<b>Section D.</b> —Delayed or improper notice by this railroad.	
		1. (a) When notice of arrival does not contain all the information specified in Rule 4, Section A, consignee shall not have the right to call in question the sufficiency of such notice, unless within the prescribed free time, he shall serve upon this railroad's agent a written statement of the omitted information required, in which event the time between receipt of such statement and the omitted information will not be computed against the consignee.	
		(b) When the consignee makes request in writing for the name of the consignor, point of shipment and (or), if transferred in transit, the initials and number of the original car, to enable him to identify the shipment in a car placed or tendered for delivery on other-than-public-delivery track, such information will be furnished, but consignee shall not be entitled to additional free time unless such request has been served on this railroad's agent within the prescribed free time, in which event the time between receipt of the request and compliance therewith will not be computed against the consignee. (See Rule 4, Section A, Note.)	
		2. When claim is made that a mailed notice has been delayed, postmark thereon shall be accepted as indicating the date of the notice.	
		3. When a notice is mailed by this railroad on Sunday, a legal holiday, or after 3:00 p. m. on other days (as evidenced by the postmark thereon) consignee shall be allowed five hours' additional free time provided he shall send or give to this railroad's agent, within the first twenty-four hours of free time, written advice that the notice had not been received until after the free time had begun to run; in case of failure on the part of consignee so to advise this railroad's agent, no additional free time shall be allowed.	

Rule	Subject	NATIONAL CAR DEMURRAGE RULES AND CHARGES—Continued	
8—Concluded	CLAIMS—Concluded	<p>4. In case of failure by this railroad to send notice in accordance with the provisions of Rule 4, Section E, the consignor shall not be held liable for demurrage charges between the date the notice should have been sent and the date it was actually sent.</p>	
		<p><b>Section E.</b>—Error of any railroad which prevents proper tender of delivery.</p>	
9	AVERAGE AGREEMENT	<p>1. Under this rule demurrage will be charged on the basis of the amount that would have accrued but for such error. This also applies in the case of constructively placed cars being "run-around" by actually placing recent arrivals ahead of previous arrivals, but allowance will only be made on cars subject to Rule 9, Average Agreement, that are held beyond the fourth debit day.</p>	
		<p><b>Section F.</b>—Delay by U. S. Customs. Such additional free time shall be allowed as has been lost through such delay.</p>	
		<p>When the following agreement has been entered into, the charge for detention of cars on all cars subject to demurrage, held for loading or unloading, shall be computed on the basis of the average time of detention to all such cars released during each calendar month; such average detention and charge to be computed as follows:</p>	
		<p><b>Section A.</b>—One credit will be allowed for each car, released within the first twenty-four (24) hours of free time. After the expiration of forty-eight (48) hours' (*96 hours on cars subject to Rule 8, Section A, Paragraph 2) free time, one debit per car per day, or fraction of a day, will be charged for each of the first four days. In no case shall more than one credit be allowed on any one car, and in no case shall more than four credits be applied in cancellation of debits accruing on any one car. When a car has accrued four debits a charge of \$5 per car per day, or fraction of a day, will be made for all subsequent detention and will apply on all subsequent Sundays and legal holidays, including a</p>	

\* Does not apply on Intrastate traffic in Arkansas, Florida, Georgia, Louisiana, North Dakota, or Oklahoma, nor on Ore Concentrates and Coal moving intrastate in Montana.



Rule  
Subject

NATIONAL CAR DEMURRAGE RULES AND  
CHARGES—Continued

9—Continued

AVERAGE AGREEMENT—Continued

Sunday or holiday immediately following the day on which the fourth debit begins to run.

**Section B.**—Credits earned on cars held for loading shall not be used in offsetting debits accruing on cars held for unloading nor shall credits earned on cars held for unloading be used in offsetting debits accruing on cars held for loading.

**Section C.**—Credits cannot be earned by private cars subject to Rule 1, Section B, Paragraph 4 (a) but debits charged on such private cars while under constructive placement may be offset by credits earned on other cars.

**Section D.**—At the end of the calendar month, the total number of credits will be deducted from the total number of debits and \$2 per debit will be charged for the remainder. If the credits equal or exceed the debits no charge will be made for the detention of the cars and no payment will be made by this railroad on account of such excess of credits; nor shall the credits in excess of the debits of any one month be considered in computing the average detention for another month.

**Section E.**—A party who enters into this average agreement shall not be entitled to include therein cars subject to Rule 2, Section B, nor shall he be entitled to cancellation or refund of demurrage charges under Section A, Paragraph 1, nor under Section B of Rule 8, except where bunching has been caused by strike of carrier's employes, or where shipments of coal, withheld by the carrier to protect its fuel supply, are subsequently delivered to consignee in accumulated numbers. (See Exception.)

**Exception.**—Section E above will not apply on Intrastate Traffic in Florida, Georgia, or Oklahoma. Section E shown below will apply.

**\*Section E.**—A party who enters into this average agreement shall not be entitled to include therein cars subject to Rule 2, Section B, nor shall he be entitled to cancellation or refund of demurrage charges under Section A, Paragraph 1, or Section B of Rule 8.

**Section F.**—A party who enters into this average agreement may be required to give sufficient security to this railroad

\* Applies only on Intrastate traffic in Florida, Georgia or Oklahoma.

Rule	Subject
	<b>NATIONAL CAR DEMURRAGE RULES AND CHARGES—Concluded</b>
	<p>for the payment of balances against him at the end of each month.</p> <p><b>Section G.</b>—An average agreement must include all cars loaded or unloaded within the jurisdiction of the same station, except that when desired separate agreements may be entered into for each plant or yard within the jurisdiction of the same station, but in no case can the cars loaded or unloaded within the jurisdiction of two or more stations be combined in one average agreement, nor shall the cars loaded or unloaded by more than one consignor or consignee be combined in one average agreement, except that cars consigned, reconsigned, or ordered to a public elevator, warehouse or cotton compress serving various parties may be combined in one average agreement.</p> <p style="text-align: center;"><b>AGREEMENT</b></p> <p>.....Railroad</p> <p>Being fully acquainted with the terms, conditions, and effect of the average basis for settling for detention to cars as set forth in....., being the car demurrage rules governing at all stations and sidings on the lines of said railroad, except as shown in said tariff, and being desirous of availing (myself or ourselves) of this alternate method of settlement (I or we) do expressly agree to and with the....</p> <p>.....Railroad that with respect to all cars which may, during the continuance of this agreement, be handled for (my or our) account at ..... (Station) (I or we) will fully observe and comply with all the terms and conditions of said rules as they are now published or may hereafter be lawfully modified by duly published tariffs, and will make prompt payment of all demurrage charges accruing thereunder in accordance with the average basis as therein established or as hereafter lawfully modified by duly published tariffs.</p> <p>This agreement to be effective on and after the..... day of..... 19.... and to continue until termination by written notice from either party to the other, which notice shall become effective on the first day of the month succeeding that in which it is given.</p> <p>Approved and accepted....., 19.... by and on behalf of the above-named railroad by.....</p>
9—Concluded	<b>AVERAGE AGREEMENT—Concluded</b>

Carload freight (except Coal and Coke, but not Petroleum Coke), for delivery from cars, or when reconsigned, will be subject to track storage charges as per schedule below at stations in New York City, Brooklyn and Long Island City, as follows:

LIST OF STATIONS		N. Y.
NEW YORK		
3rd Street		
36th Street		
60th Street		
130th Street		
Inwood		N Y
Kings Bridge		N Y
Morris Heights		N Y
High Bridge		N Y
Melrose Junction		N Y
Westchester Avenue		N Y
Port Morris		N Y
Claremont Park		N Y
BROOKLYN		N Y
Brooklyn Eastern D. tract Terminal		
Jay Street Terminal		
Baltic Terminal		
Fulton Terminal		
Atlantic Terminal		
Bush Docks		
LONG ISLAND CITY		N Y
Queensboro Terminal		N Y

The following schedule of track storage charges will apply in addition to the regular car demurrage charges upon carload freight for delivery from cars, or when reconsigned, at the stations specified:

For the first 48 hours after car is placed on team track for delivery (time will be computed from the first 7 A. M. after placement on public delivery tracks, and after the day on which notice of arrival is sent or given to consignee), no charge will be made.

For the next succeeding two days.....\$1.00 per car per day or fraction thereof.

For each succeeding day.....2.00 per car per day or fraction thereof.

NOTE.—In computing time, Sundays and full legal holidays (National, State and Municipal) will be excluded. When a legal holiday falls on a Sunday, the following Monday will be excluded.

#### NOTIFICATION.

##### Section A.

Notice shall be sent or given consignee by carrier's agent, in writing, or as otherwise agreed to by carrier and consignee for delivery from cars, or when reconsigned, at the stations specified, of the arrival of the car, of the date and numbers, and the contents, and, if transferred in transit, the initials and number of the original car. In case car is not placed on public delivery track within twenty-four hours after notice of arrival has been sent or given, a notice of placement shall be sent or given to consignee.

##### Section B.

In all cases where notice is required, the removal of any part of the contents of a car by the consignee shall be considered notice thereof to the consignee.

#### CLAIMS.

No track storage charges shall be collected under these rules for detention of cars through causes named below. Track storage charges assessed or collected under such conditions will be promptly cancelled or refunded.

##### Section A.—Weather Interference.

1. When the condition of the weather during the proscribed free time is such as to make it impossible to employ men or teams in unloading, or to remove freight from cars without serious injury to the freight, the free time shall be extended until a total of 48 hours free from such weather interference shall have been allowed.

2. When shipments are frozen while in transit so as to prevent unloading during the prescribed free time. This exemption shall not include shipments which are tendered to consignee in condition to unload. Under this rule consignee will be required to make diligent effort to unload such shipments and shall not be entitled to additional time unless within the prescribed free time he shall serve upon the carrier's agent a written statement that the loading was frozen upon arrival.

3. When, because of high water or snow-drifts, it is impossible to get to cars for unloading during the prescribed free time. This rule shall not absolve a consignee from liability for track storage if others similarly situated and under the same conditions are able to unload cars.

##### Section B.—Bunching.

Cars for unloading.—When, as the result of the act or neglect of any carrier, cars destined for one consignee, at one point, are bunched at originating point, in transit, or at destination, and delivered by this railroad in accumulated numbers in excess of daily shipments, the consignee shall be allowed such free time as he would have been entitled to had the cars been delivered in accordance with the daily rate of shipment. Claim to be presented to carrier's agent within fifteen (15) days after the date on which track storage bill is rendered.

##### Section C.—Demand of overcharge.

When the carrier's agent demands the payment of transportation charges in excess of tariff authority.

##### Section D.—Delayed or improper notice by carrier.

When notice has been sent or given in substantial compliance with the requirements as specified in these rules, the consignee shall not thereafter have the right to call in question the sufficiency of such notice, unless within forty-eight hours from 7:00 a. m. following the day on which notice is sent or given he shall serve upon the delivering carrier a full written statement of his objections to the sufficiency of such notice.

1. When claim is made that a mailed notice has been delayed, the postmark thereon shall be accepted as indicating the date of the notice.

2. When a notice is mailed by carrier on Sunday, a legal holiday or after 3:00 p. m. on other days (as evidenced by the postmark thereon), the consignee shall be allowed five hours' additional free time, provided he shall mail or send to the carrier's agent, within the first twenty-four hours of free time, written advice that the notice had not been received until after the free time had begun to run; in case of failure on the part of consignee so to notify carrier's agent, no additional free time shall be allowed.

##### Section E.—Railroad errors which prevent proper tender or delivery.

##### Section F.—Delay by United States Customs

Such additional free time shall be allowed as has been lost through such delay.

### TRACK STORAGE

**26.** An additional penalty for delay in releasing cars is sometimes provided in the form of track storage. This is a charge for the use of the track on which a car under demurrage stands. Fig. 3 contains rules and regulations under which track storage is handled by one of the roads serving New York City. It will be noted that the conditions in connection with track storage are similar to those in connection with demurrage. The uniformity of regulations which is found in connection with demurrage is lacking in the handling of track storage, for the individual carriers not only have varying regulations, but some do not assess track storage.

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### STORAGE OF FREIGHT

**27. When Freight Is Stored.** -In addition to the freight that is held in vehicles, and for which demurrage or track storage is charged, there is a large amount that is stored by the carriers in freight houses, warehouses, yards, and on docks. A considerable volume of this kind of storage is less-than-carload freight, but a certain amount of it arises in the handling of carloads, because the car is immediately needed for other service or because it is apparent that the vehicle will not be released for some time.

When freight has not been removed from the property of the carriers within a reasonable time after the consignee has been notified of its arrival, it is the right of the carriers to put it in storage, either on their own property or in public warehouses, and they often exercise this right, especially in the large cities where there is only sufficient space on the carrier's property to take care of the freight that is all the time coming in and going out.

Regardless of where the storage takes place, the owner of the freight will have to pay the storage charges unless he can show that there was some defect in the arrival notice for which the carriers were to blame. The fact that the consignee did not receive the arrival notice does not alter the obligation of the owner to pay storage charges if the arrival notice was mailed to the right address,

**28. Rates and Regulations.**—A carrier performing storage service does so under published rates and regulations, as tariffs covering this service must be published and filed the same as those carrying transportation rates. Storage charges, like demurrage charges, are, to a considerable extent uniform

STORAGE RULES AND CHARGES APPLICABLE TO FREIGHT HELD OR STORED IN OR ON RAILROAD PREMISES OF RAILROADS PARTIES TO TARIFF AS AMENDED					
Rule No.	SUBJECT	RULES			
5-D Charges for Storage on Freight other than Explosives and other Dangerous Articles (See Note 1 in body of item, page 4)		Section A. Freight, except Automobiles or other self-propelling vehicles (but not excepting Motorcycles or bicycle motor wheels), held in or on railroad premises in excess of free time allowed, will be subject to the following storage charges per day or at option of carrier may be sent to public warehouses:			
		At Points in GROUPS See Items Nos. 3, 4, 5 and 6, Pages 4 to 9, Incl., of Supplement No. 4, for Explanation.			
		A	B	C	D
		In Cents per 100 Pounds			
		For each of the first five days.....	⑤ ① 3	2½	2½
		For the sixth and each succeeding day.....	4	4	4
		Minimum storage charge per shipment on freight held beyond free time, five (5) days or part thereof, 25 cents; six (6) days or more, 50 cents.			
		Section B. After expiration of free time, Automobiles or other self-propelling vehicles (except Motorcycles and bicycle motor wheels) will be subject to a storage charge of four (4) cents per 100 lbs. per day, with a minimum charge of \$1.00 per machine per day for each of the first five (5) days, and \$2.00 per machine for each succeeding day, or at option of carrier, may be sent to public warehouses.			
		Section C. (a) When carload freight is unloaded by the carrier for the purpose of releasing needed equipment, the storage charge will be the same as would have accrued under the above rules had the freight remained in the car. (See Rule 1, Section C of tariff.)			
		⑬ (b) When carload freight is unloaded in or on railroad premises by or upon request of consignee or consignor, the storage charges shall not exceed the amount that would have accrued under Demurrage and Track Storage Rules had the freight remained in the car.			
① On Intrastate traffic in * * *, * * *, Iowa, Missouri and Wisconsin charge will be 2½ cents per 100 lbs.					
② On Illinois Intrastate traffic the charge will be 2½ cents per 100 lbs., in connection with the following lines: Chicago & Calumet River R. R. Co. Illinois Central Electric Railway Chicago, Harvard & Geneva Lake Ry. Illinois Traction System Chicago, North Shore & Milwaukee R. R. Kankakee & Urbana Traction Co. Chicago, Ottawa & Peoria R. R. St. Louis and Ohio River Railroad East St. Louis, Columbia & Waterloo Ry. The Westfield Railroad Co. also on Indiana Intrastate traffic in connection with Chicago, Lake Shore & South Bend Ry. Co.					
④ Effective May 2, 1921, except as noted. Issued on five days' notice under special permission of the Interstate Commerce Commission, No. 52506 of April 6, 1921. Issued on five days' notice under authority of State Railroad Commissions as shown in Note 1 above. Effective May 25, 1921, on Intrastate traffic in Arkansas and North Dakota.					
⑤ Will not apply on Intrastate traffic in Florida, Georgia, Mississippi, Nevada and Virginia. * * * "Illinois" eliminated. * * * "Indiana" eliminated. (Concluded on following page)					
Ⓜ Reduction.					

FIG. 4

(1174)

throughout the United States. Agent J. E. Fairbanks publishes Uniform Storage Tariff, 1 series, from which Fig. 4 is an excerpt showing the rates charged. A study of the regulations governing storage charges will show that they are similar to demurrage regulations.

Public warehouses are not subject to rate regulation in most states, so that the owner of freight has to pay such charges as are assessed by the warehouse where his freight has been stored. A disagreeable feature of storage in public warehouses is that if freight is lost or damaged it is often difficult to locate responsibility as between the carrier and the warehouseman.

**29. Responsibility for Stored Freight.**—While many shippers and receivers of freight look at the storage of undelivered freight more especially from the standpoint of additional expense, there is another side which may be much more important. Warehousemen cannot be held to such strict accountability for loss and damage as can a transportation company, for while a carrier can be held for almost any loss or damage that occurs to freight in its possession, the warehouseman is liable only for reasonable care in taking care of what is entrusted to him. For example, if a shipment is destroyed by fire while it is being transported, the chances are very good for holding the carrier liable, regardless of the cause of the fire. On the other hand, if a loss from fire takes place in the warehouse, the warehouseman can clear himself of responsibility by showing that he exercised reasonable care in guarding against such a loss.

It should be understood that the term *warehouseman* is not limited to those who are exclusively in the warehouse business, as a carrier is liable only as a warehouseman, when a reasonable opportunity has been given to the owner of a shipment to remove his property and he has not done so. While there can be no fixed rule as to what constitutes reasonable time, it is very often held that the free time allowed may be considered as the measure of reasonable time for the removal of property. Therefore it is usually a fact that after a shipment becomes subject to storage or demurrage the carrier is liable only as a warehouseman.



## WEIGHING

**30. Importance of Correct Weights.**—Since freight charges are based on weights, it is important that the weights be correct and be obtained with the least possible expenditure of time and money. Errors in weights are often made both in carloads and in less-than-carload lots, and while individual errors on weights of carloads are likely to be larger than those on smaller quantities, the total amount of errors on a large number of small shipments may be large. Great care is usually taken to determine the lowest rate that can be obtained, but errors of weight may easily amount to more than those of rate.

Weights are obtained in one of three ways: (1) From weights furnished by the shippers; (2) from weights furnished by the carriers; (3) from weights furnished by one of these parties and verified by the other.

In the case of carload weights, much dependence is placed upon weights obtained by the carriers on their track scales. Many shippers have no other facilities for weighing their shipments than small platform scales or wagon scales, both of which are liable to prove unreliable because of failure to have them properly inspected and adjusted. Railroad scales are regularly inspected and adjusted to insure accuracy. Some of the larger shippers have accurate weighing facilities for carloads, but the larger part of the carload business is weighed on the railroad track scales.

**31. Rules for Weighing.**—The matter of weighing of carloads by the railroads is governed by rules, and Fig. 5 shows the weighing regulations of one railroad. It will be seen that charges are made for some weighing services and not for others; therefore, as these rules are local in their application, it is necessary that shippers and receivers of freight should consult the rules of the roads that serve them.

**32. Agreed Weights.**—While there are many kinds of freight of which the weight can be obtained only by actually weighing each shipment, there are other kinds where the weight is so nearly uniform that once reliable weights of pieces, pack-



**Section No. 11.**

**WEIGHING OF CARS, LOADED OR EMPTY.**

No. 1. It is the practice of the carriers to require that property tendered for shipment shall be transported under its proper description and at its actual weight, unless otherwise provided by classification or tariffs.

No. 2. Carload shipments are frequently weighed enroute by carriers on their own track scales, using stenciled weight of the car in ascertaining the weight of contents.

No. 3. Where loads have been transferred enroute, where cars have met with an accident, or where, for other similar reasons, there is evidence of loss in transit, the carriers will, when practicable, further verify railroad billing weights by reweighing cars enroute or at destination, without charge.

No. 4. When outbound carload shipments are weighed by carriers on their own scales to ascertain weights for way-billing purposes no charge will be made for the service, it being understood that the stenciled weight of the car will be used in arriving at the net weight; when for the convenience of and benefit to the carrier such shipments are weighed on shippers' private scales, cars may be weighed both light and loaded without charge.

No. 5. At Jersey City, N. J., Weehawken, N. J., and Undercliff, N. J., cars will be weighed empty without charge when to be used for import traffic.

No. 6. When a car is weighed or reweighed, either empty or loaded, at the request of either consignor or consignee, the service and charges will be in accordance with conditions named below:

- A. When weighed or reweighed on consignor's or consignee's scales, located at the industry, a charge of thirty-five (35) cents per car will be made each time the car is weighed.
- B. When weighed or reweighed on railroad company scales, when such service is performed at scales within the switching limits (provided scales are located in the immediate vicinity of the industry or unloading tracks), a charge of one dollar and fifty cents (\$1.50) per car will be made each time the car is weighed.
- C. When weighed or reweighed on private scales, other than those owned by shipper or consignee, at whose request weighing or reweighing is done, when such scales are within the switching limits, a charge of one dollar and fifty cents (\$1.50) per car will be made each time the car is weighed. The parties desiring the weighing or reweighing done must make their own arrangements with the owners of the scales for their use, the charge of one dollar and fifty cents (\$1.50) covering only the weighing service performed by the carriers.
- D. When a consignee has track scales conveniently located, a limited amount of reweighing will be done by the carriers without charge, provided the amount of reweighing required is not in excess of 10 per cent. of the total inbound traffic received by such consignee (coal, coke and iron ore not to be weighed or reweighed, except as provided in Section E.) Any reweighing requested by such consignee, which is in excess of the 10 per cent. as above provided, will be charged for in accordance with the foregoing rules.
- E. When a shipper or consignee shall furnish evidence of error, in the carrier's weight of any carload shipment, due to causes other than natural shrinkage, and requests that such car be reweighed, this service, wherever practicable, will be performed by the carrier without charge, provided such reweighing discloses error in the carrier's weight of one thousand pounds or more, it being understood that the rules and carload minimum weights prescribed in tariffs and classification shall be observed, otherwise the charges under the foregoing rules will apply.
- F. If, in weighing or reweighing in accordance with the above, it is found necessary to handle the cars in road service, or in switching service between the industry or team tracks and the scales when they are not located in the immediate vicinity of each other, the regular tariff or switching rates lawfully on file with the Interstate Commerce Commission, Public Service Commission, Second District, State of New York, and Public Service Commission of the Commonwealth of Pennsylvania will be charged, which will be in addition to the charge for weighing service named above.
- G. When weighing or reweighing is done on private scales, such scales must be located within a distance of one mile from plant of shipper or consignee. When extra handling is necessary the same will be charged for at the current tariff rates lawfully on file with the Interstate Commerce Commission, Public Service Commission, Second District, State of New York and Public Service Commission of the Commonwealth of Pennsylvania.

**FIG. 5**

ages or units have been obtained, such weights can be used without the necessity of continually weighing shipments. This is the case of package goods of various kinds, lumber, oil, etc. Canned goods are an example of a class of articles in which the only variation in weights of packages of the same-sized cans of the same commodity would be on account of variation in the thickness or dryness of lumber used in the packages.

Recognizing the material saving in time and labor which results from not having to weigh each shipment of a specified commodity when it is shipped, the carriers have made provision for what are known as *agreed weights*. In other words, they have made provision by which carriers and shippers can determine, by such tests as may be thought necessary, the weight of a specified commodity when shipped under certain conditions. When these weights have been obtained, a regularly established form of agreement will be entered into by which both sides will accept the weights as being correct unless something arises to prove that such is not the case. Such agreements are entered into with the specific understanding that the carriers are to have such access to the shippers' records and plant as will enable their representatives to keep themselves fully informed as to the situation. Any changes which make or may make a difference in the agreed weights should be promptly reported to the carriers so that any necessary changes can be made.

The following are the most essential rules in regard to weight agreements:

1. The shipper shall report and certify correct gross weights (except where estimated weights are provided in tariff or classifications), and correct description of commodities on shipping tickets, bills of lading or weight certificates, and correct gross, tare and net weights when obtained on track scales, where such weights are used for billing purposes.

2. The shipper shall allow the authorized representative of the carriers to inspect the original weight sheets, books, invoices, and records necessary to verify the weights and description of the commodities certified in the shipping tickets, bills of lading or weight certificate.

3. The shipper shall promptly pay to the authorized representative of the carriers, bills for all undercharges resulting from the certification of incorrect weights or improper description.

4. When weights of uniform or standard-weight articles are based upon averages, the shipper shall give prompt notice to the authorized

representative of the carriers when any change is made in the package or material used which will affect the weight arrived at by the use of the average.

5. The shipper shall keep in good weighing condition any and all scales used in determining weights, and have track scales tested, maintained and operated in accordance with the Track Scale Specifications and Rules approved by the American Railway Association, and shall allow the authorized representative of the carriers to inspect and test them.

6. The agreement may be cancelled by 10 days' notice in writing to either party.

7. All shipments made under the agreement will be subject to rates and charges prescribed by classifications, tariffs or rules of the carriers interested.

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### SWITCHING

**33. What Constitutes Switching.**—A bill of lading shows a certain city or town as the point where the shipment originates, and another city or town as the point where the delivery was or is to be made. However, it is well known that a shipment is not only loaded and unloaded at some



FIG. 6

definite city or town, but at some specific spot in that city or town. For example, if a car moves from Pittsburgh to Chicago, that car was loaded at some specific spot in Pittsburgh, perhaps on the shipper's private side track, and was unloaded at some equally specific spot in Chicago, perhaps a team track on the delivering road. The movement between the two cities would be known as the *line haul*, while the movement from the loading point to the place where the train is made up and from the place where the train is broken up to the unloading point would be known as switching. For example, in Fig. 6 *a b* represents a private siding where a car is loaded, *b* represents the yard where a car loaded at *a* is put into a through train; the line between *b* and *c* represents the railroad over which the shipment is hauled between New York and Chicago, and *c d* represents the team track on the delivering road. The movement from *a* to *b* and from *c* to *d* would be known as switching, and the haul from *b* to *c* would be line haul.

The line haul is generally what is meant when reference is made to the term "transportation service", while switching is one of the special services closely related to transportation services but not included in them.

**34.** Switching may be defined as the movement of cars within defined areas known as switching limits. The extent of switching limits depends on such matters as the number of roads involved, the amount and kind of traffic handled, and the size of the cities or towns involved. Thus the switching limits for a small city served by one road will be very small in area, while the switching limits of Chicago cover an area somewhat larger than the City of Chicago.

While reference has been made to switching in connection with line-haul traffic, it should be understood that switching is important, even where there is no line haul involved. For switching plays a very important part in the conduct of business, particularly in cities like Chicago, where distances within switching limits are greater than is the case with many line-haul deliveries. Also, outside of the cities, some large industries comprise within their switching limits such extensive areas that movements between points within them may involve a haul of several miles.

**35. Charges for Switching.**—In regard to switching charges, four facts are of importance: (1) Charges are generally assessed upon the per car basis, instead of upon the weight basis as is usually the case with line-haul charges; (2) switching charges are generally lower than line-haul charges for the same distance; (3) rates and regulations are for the most part published in tariffs having application only within specified switching limits; (4) switching charges are often paid, or *absorbed*, by the line that has performed the line haul. Thus if road A performs the line haul on a shipment for which road B performs the switching, provision may be made by which road A will pay the switching charges assessed by road B.

Because of this last-named condition in connection with switching charges, many shippers and receivers of freight do not think of switching as a factor of cost in getting shipments

transported; for if it happens that the line-haul carriers absorb the switching charges on the shippers' or receivers' traffic, the matter of the cost of switching does not have to come into their consideration. The absorption of switching charges is optional with carriers so long as all who are similarly situated are treated alike. There is no rule relative to the matter, beyond the fact that carriers generally provide for the absorption of switching charges at points served by two or more carriers, and do not provide for absorption where only a single line can perform the line haul. The only way to be sure in regard to any given case is to give careful attention to the tariffs and find out what, if any, provisions they carry relative to absorption of charges for switching.

**36. Spotting** is a specialized form of switching by which a car is not only placed on a certain track, but at a specified point on that track. For example, a side track may have room for four cars to be placed opposite four numbered doors in the warehouse which the track serves. If it were desired to have a car placed opposite Door 2, it would be said that the car was to be spotted at that point on the track. Again if a car carrying a heavy girder were to be unloaded by a derrick in the railroad yard, it would be said that the car was to be spotted at the derrick.

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### TRANSIT SERVICES

**37. Granting of Transit Privileges.**—In regard to the stopping of goods in transit to allow of the performance of manufacturing or other necessary processes on them, the carriers have greater freedom as to rendering such services and as to the charges they may make than they have in regard to the other services previously described. This is the case because it is the recognized duty of a common carrier to deliver goods promptly, to charge reasonable rates, and to provide for the performance of such supplementary services as naturally arise in connection with the receipt and delivery of goods, but it is not a part of the carrier's duty to allow goods to go out

of its possession for commercial reasons, before the delivery of the shipment has been completed. If, then, the carrier does allow the interruption of transportation for other than transportation reasons, it is at liberty to specify the conditions (including the rates) under which it will allow such interruptions to take place, subject only to the limitation that it must not unjustly discriminate in such matters. For example, a certain road might not be under any obligation to allow logs to be stopped in transit to be sawed into lumber, but if it allowed such a practice at one point it would be under obligation to allow it at some other point where similar conditions obtained. If the carrier were ordered to remove the discrimination, it could either accord the complaining point the same rates and regulations as obtained at the other point, or it could take away the advantage accorded the other point. Because the carrier has the right to control the situation in such cases, these services are known as *privileges*. It is a fact that, though the

$a$  —————  $b$  —————  $c$

FIG. 7

Interstate Commerce Commission has repeatedly stated its belief in the value of transit

privileges in the commercial life of this country, it has found only a comparatively small number of cases where it has felt justified in *ordering* privileges established to remove discrimination.

**38. Operation of Transit Privileges.**—The manner in which transit privileges operate to promote business and allow manufacturing to be done where there are suitable facilities for doing the work is shown by the following example:

In Fig. 7, let  $a$  represent a point where a considerable amount of wheat originates,  $b$  a point where flour mills are located, and  $c$  a point where there is a considerable amount of flour consumed. Let it further be assumed that there is a rate of 50 cents per hundred pounds on wheat from  $a$  to  $b$ , a rate of 20 cents per hundred on flour from  $b$  to  $c$ , and a rate of 60 cents per hundred on flour from  $a$  to  $c$ .

It is no evidence that the rate from  $a$  to  $b$  or from  $b$  to  $c$  is unreasonable because the two rates added together make a

higher rate than the through rate from *a* to *c*, but it is a fact that the disadvantage of 10 cents per hundred pounds which arises from having the flour ground at *b* will be more than enough to prevent the mill at *b* from getting its share of business. The only way in which this situation can be taken care of is for the railroad to bill shipments into *b* at the local rate, and when the shipment is billed out to *c* to deduct the amount already paid from the through rate of 60 cents. In this way the local rates will not be disturbed, but a point that would otherwise be at a disadvantage is put on an equality with other points, so far as the traffic mentioned is concerned. In some cases there will have to be added to the transportation charges some additional charges for the transit privilege.

**39. Rules Governing Transit Privileges.**—The regulations governing transit privileges vary according to circumstances. The accompanying Rules Regarding Transit Privileges show the conditions under which transit privileges are accorded to two closely related commodities, and especial attention should be given to the following mentioned rules, which are fairly representative of the more common features of transit regulations:

In Paragraph 1, it will be noted that a charge is made for the exercise of the transit privilege. Investigation would show that this charge is much less than would have to be paid if it were necessary to pay the regular rates into and out of one of the transit points, such as Bath.

In Paragraph 2, provision is made that the privileges are contingent upon the forwarding of the hay or straw within 90 days from the date the shipment reaches the transit point. The time allowed for shipments to be held at transit points, in different places and for different commodities, varies all the way from a few days up to several months, as provided in the individual regulations. The effect of failure to move shipments in the required time is that the regular inbound and outbound rates are charged, in other words, the benefit of in-transit rates is lost.



## RULES REGARDING TRANSIT PRIVILEGES

## Section No. 26.

CUTTING, INSPECTION, MIXING, RESORTING OR SAMPLING OF HAY AND STRAW AT AVOCA, N. Y., BATH, N. Y., CANASERAGA, N. Y., ELMIRA, N. Y., OR WAVERLY, N. Y.

Transit privileges on Hay and Straw (including Alfalfa Hay) is the stopping for Cutting, Inspection, Weighing, Mixing, Grading, Storing, Sampling, Change of Ownership, Consignee or Destination, and will apply only to such Hay or Straw (when in carloads) stopped in transit at Avoca, N. Y.; Bath, N. Y.; Canaseraga, N. Y.; Elmira, N. Y., or Waverly, N. Y., and reforwarded subject to the following rules:

1. A charge of \$4.00 per car will be assessed for the stop-off (except as hereinafter named) in addition to the rate in effect from point of origin to final destination via the transit point at time of original shipment.

2. The Hay or Straw must be forwarded from the transit point within ninety days from date of delivery of the property at the transit point.

As to any shipments of transit commodities on which the time limit as above prescribed has expired the transit privilege shall absolutely cease and the carload rate to the transit point in effect at time of shipment from point of origin will be charged.

When such Hay or Straw is reforwarded the published tariff rate in effect from the transit point to final destination at the time of reshipment shall be applied.

3. Whenever the outward tonnage of the Hay or Straw exceeds the weight of the inward movement, the carload rate from the transit point in effect at time of reshipment may be used on such surplus if the total weight in car equals or exceeds the carload minimum weight applicable. In case the outward weight is less than the inward weight, the through charges shall be based on the inward weight. In either case the stop-off charge of \$4.00 per car shall be assessed in addition.

4. Transit privileges will only be accorded parties who comply with the rules named herein, who will keep record and make report, in a manner satisfactory to this Company, and who will make affidavit, when required, as to the accuracy of all records and information furnished by them to this Company.

5. (A.) When the Hay or Straw, reshipped from transit point, involves a back haul to a destination on Erie Railroad Company, the following rates will apply in addition to the rates on the Hay or Straw to the transit point plus transit charge named in Rule 1:

When back haul is 1 to 30 miles, inclusive				3	cents per 100 pounds.			
"	"	"	31 to 61	"	"	4½	"	"
"	"	"	61 to 100	"	"	6	"	"
"	"	"	100 to 125	"	"	7½	"	"

To ascertain mileage as shown above, see Erie R. R. Station List.

To ascertain the charges under these rules the actual weight (subject to carload minimum) of the Hay or Straw must be used.

This transit privilege will be granted at other points upon written application to this Company by parties desiring to avail themselves of such privilege.

**40.** With a very few exceptions, under transit privileges, no greater weight can be shipped out than came in on a specified shipment. When such greater weight is offered, usually freight from some other shipment has been included. It will be noted that paragraph 3 provides that any weight in excess of the incoming amount will be charged for on the basis of the regular rates from the transit point to destination.

If there is one feature of transit privileges which needs special emphasis, it is the provisions of paragraph 4. It is not enough that certain traffic shall be that for which transit privileges are provided, but it is also essential that all the regulations provided shall be adhered to in every respect.

The last paragraph of the rules indicates that transit privileges will be granted to other points under certain circumstances. It is, however, the policy of the railroads to provide transit privileges only at points where an actual need for them is shown.

**41. Transit Problems.**—While the regulations governing transit, which have just been discussed, are not long, and may not seem complicated, it is a fact that the carriers often have some very complicated problems to solve in providing and enforcing regulations to govern transit privileges. Some idea of the complexities of the situation may be realized from consideration of the handling of wheat which comes into an elevator, and goes out as flour. The procedure is as follows: (1) When a car of wheat comes into the elevator, a complete record of it must be made, including such information as the weight of the wheat, car number, kind of wheat, etc.; (2) when the carload of flour which is charged against the carload of wheat goes out, a complete record must be made and checked against the incoming records; (3) the transportation charges must be adjusted, consideration being given to the amount of

incoming charges paid and the through charges. The freight bill in connection with the incoming movement is a necessary document in connection with the final adjustment.

In order to appreciate fully the difficulties of the situation, it is necessary to give consideration to the physical side of the handling of the commodities, as well as to the accounting to which reference has just been made. If only a single carload of wheat were going through a mill or elevator at one time, the matter would be quite simple; but if a mill is of any considerable size, several cars will be unloading at one time, and many cars will be going out. The result is, that when an outgoing carload is charged against some incoming carload, this charge really means nothing more than that, if the incoming car contained hard wheat, an equivalent weight of flour made from that kind of wheat has been loaded and shipped from a considerable number of carloads of that kind of flour which is in the bins of the mill. To put the matter in another way, it may be supposed that during a certain period of time the mill receives 100 carloads of hard wheat and sends out an equivalent number of carloads of flour, bran, etc., milled from that kind of wheat. It is not probable that any one can definitely say that any particular carload of flour that went out actually came from the car against which it was charged in the transit records.

**42.** In view of the impracticability of sending out, car for car, what comes in, it is very essential that the accounts be accurately kept so as to guard against the sending out of a different kind of commodity than that received. For example, it would not only be inaccurate, but illegal, to send out a car of soft lumber and charge it against a carload of hardwood logs. Such errors occur from time to time, but the Interstate Commerce Commission is very insistent that the carriers keep them to a minimum, as the "substitution of commodities", as it is called, is one of the abuses that has caused criticism of the granting of transit privileges.

Though the transit privileges in connection with the milling of flour have been described, it is not intended to suggest that

such privileges are mostly to be found in connection with that commodity, as such is far from being the case. A complete list of transit privileges would include a vast number of commodities, and an almost innumerable list of processes, among which may be included the compression of cotton, the cleaning of beans, the fabrication of steel, the mixing of feed, and the creosoting of ties.

**43. Suggestions.**—The following suggestions may be of value to those whose business is such as to be affected by transit privileges: (1) A careful investigation should be made to see whether there are any privileges in effect on any specified traffic in which the individual is interested. (2) If there are any privileges in effect on competitive traffic, an effort should be made to see whether conditions are not sufficiently similar to justify asking the carriers to extend their application. (3) If there are no privileges in effect, an effort should be made to show the carriers why they should be established. In view of the fact that the carriers are generally not under obligation to establish such privileges, it may be necessary to show that there will be an increase in profitable business as a consideration for the according of these privileges. (4) If there are provisions made for transit privileges, a careful study must be made to determine under exactly what conditions the privileges are applicable. For example, attention has already been called to the fact that one of the conditions under which the transit privileges specified in the rules given would be accorded, is that certain records must be kept.

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## VARIOUS SPECIAL SERVICES

**44.** Special services in great variety are performed by the railroads, as it is their policy to provide for the needs of various kinds of traffic so far as it is practicable to do so. Therefore, in one instance a certain service may be performed at only one point in the country, while some other service may be provided at numerous points, as in the case of switching service. Some idea of the variety of services furnished may be obtained from

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FIG. 8

Fig. 8, which is taken from the special-service tariff of a large eastern road.

An example of several services being furnished to accomplish one result is found in connection with the work of the foreign-freight departments of the railroads. An analysis of the work of such departments will show that they undertake to do almost anything necessary to get export or import shipments through ports like New York, Boston, etc.

The carriers are always glad to furnish information as to the special services they render, and it will be found that such services often include not only those which must be performed by transportation companies, but those which might be rendered by private individuals. It is often the case that carriers render services where shippers or consignees do not have representatives, and where it is of material value to have certain matters taken care of promptly and reliably. For example, one such rather small service is the reoperating of defective packages. Many hundreds of dollars a year are saved by the renailing of cases or the putting of new heads in barrels.

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## WAREHOUSES IN RELATION TO TRANSPORTATION

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### WAREHOUSES AS IN-TRANSIT FACILITIES

#### 45. Conditions Influencing Use of Warehouses.

A public warehouse is one which, though operated by a private individual or corporation, accepts for storage goods belonging to any one having need for such services, rent or storage being charged for the accommodation.

For many years the public warehouse was looked upon as a facility to be used before transportation began or after it had been completed, although there were exceptional cases where the shipper found that he had to make use of public storage facilities because a consignee did not take delivery of goods intended for him. That the public warehouse could and should be an in-transit facility was not appreciated, even by the warehousemen themselves, whose energies were expended in try-

ing to secure such business as came to their locality without solicitation on their part. Within a comparatively short time it has come home to both warehousemen and shippers that public warehouses, instead of being utilized as a facility entirely unrelated to transportation, should be utilized as something very closely related to it. To some extent, this use of warehouses has been hastened by changes in rates and transportation conditions, which have made the use of storage in transit profitable where formerly it might not have been. In all lines of business, it is essential that supplies shall be available on as short notice as is consistent with reasonable economy in the cost of handling; and the value of stocks available for use has been plainly shown at times when the railroads were overburdened with traffic or congested by strikes.

Aside from the advantages under conditions such as mentioned, the freight-rate situation has increased the value of the public warehouse as an in-transit facility, because the difference between the carload and the less-than-carload rates is now much greater than was previously the case. This condition has in many cases made it profitable for shippers to ship in carloads for long distances, to a warehouse located at some central point in the district where delivery of the shipments constituting the carload is to be made, and then to distribute the contents by short-distance less-than-carload shipments or by truck, the difference between the carload and the less-than-carload rates being sufficient to allow for paying warehouse charges and still afford some saving for the shipper.

**46. Relative Advantages of Public and Private Warehouses.**—If it be thought desirable to have warehouse facilities at a certain point, the question arises, should a private warehouse be maintained or should public warehouses be used? The relative costs of the two will naturally be a factor, but not necessarily a governing factor; as ownership and control of facilities and services will often be of value beyond any dollars-and-cents showing. Regardless of the desire and ability of public organizations to serve their patrons, there will necessarily be times when the conflicting requirements of two or more



patrons will restrict, to some extent, the freedom of action of each.

When the amount of the shipments is large and fairly regular, so as to keep a certain amount of space filled at all times and a certain number of employes busy, local conditions may determine whether it is advisable to maintain a private warehouse or to use a public one. But in case of a comparatively small amount of shipments or shipments at irregular intervals, the use of a public warehouse is likely to be the more economical.

**47.** The following facts and figures furnished by the president of the Central Warehousemen's Club show the importance of carefully considering all the circumstances:

In one case, a manufacturer of washboards rented a suite of offices in one of the large office buildings in the Loop District of Chicago with the intention of using one small office for desk room and the remainder for the storage of one or two carloads of washboards. A friendly teaming contractor induced him to look into the matter of public storage, with the result that the manufacturer was able to make a very substantial saving.

Another case is that of a company manufacturing scales, who leased a warehouse for its Chicago branch office on a yearly basis, paying about \$100 per month for it. This space had no rail facilities so everything had to be teamed in. One man was necessary all the time at the expense of about \$125 per month, and at the time cars were received an additional man was required. The building was an old one with a very high rate of insurance and very poor loading platforms. The company handled from one to three cars per month. Taking two cars as an average, the cost per month was about as follows:

Rent .....	\$100.00
Shipping clerk .....	125.00
Extra labor .....	25.00
Insurance .....	10.00
Teaming in two carloads .....	50.00
Telephone .....	5.00
Total .....	<u>\$315.00</u>
Average cost per car .....	157.50

It should be noted that in this case nothing is added for supervision or executive expense.

This service could have been performed for much less by a public warehouse, as the actual labor of handling was comparatively small and the teaming charges would have been avoided entirely.

Still another case is that of a dealer in roofing paper, who leased from a Chicago warehouse a space amounting to approximately 3,000 square feet, for which he paid \$100 per month. He employed a shipping clerk and at times during a period of heavy receipts or deliveries sent men from his retail store to assist this man. He also secured a small amount of labor from the warehouse when necessary.

Later, the warehouse company terminated his rental arrangement and took over his stock on regular storage.

A comparison of the actual cost of handling on leased space as against public storage shows that during the five months, May 1 to Sept. 30, under the rental arrangement, he handled twelve cars and his costs were as follows:

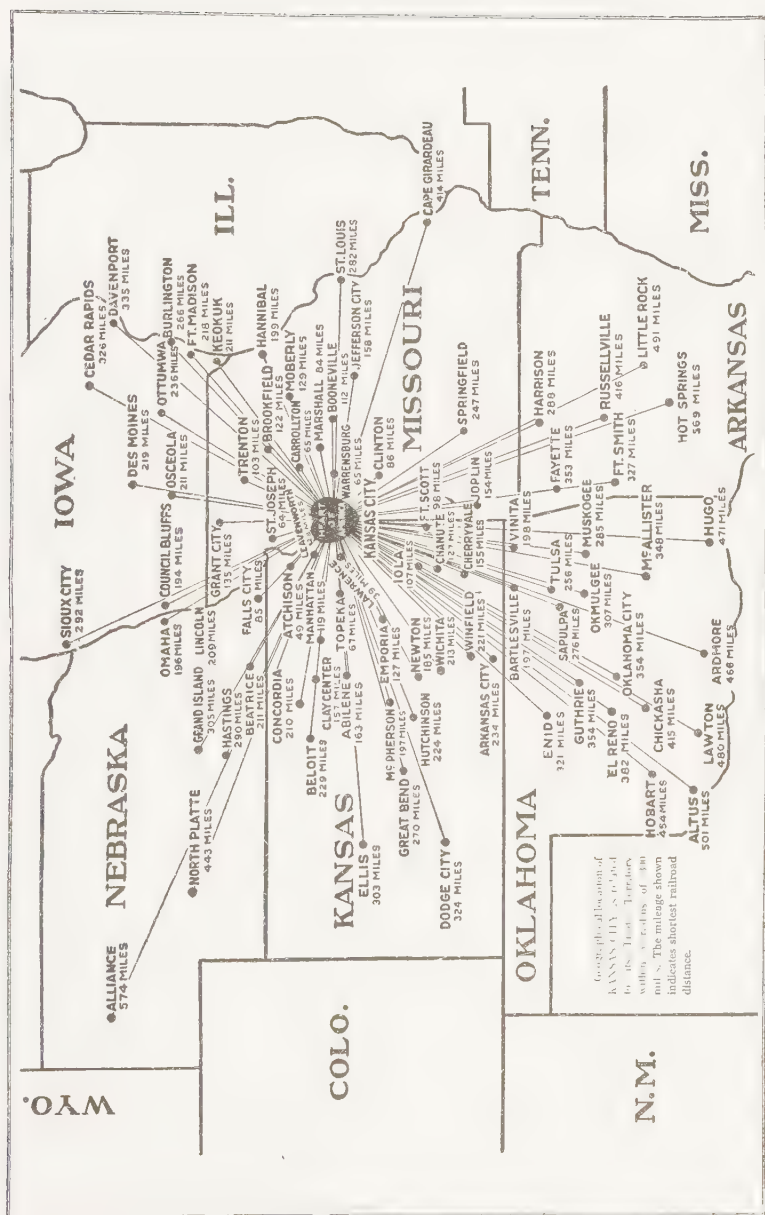
Rent .....	\$500.00
One man 22 weeks at \$30.....	660.00
Paid warehouse for extra labor....	36.63
<hr/>	
Total .....	\$1,196.63

No figures are available showing the expense of labor sent from retail store.

During the period May 1 to Sept. 30, of the following year, owing to the slack building conditions, only eight cars were handled under the storage arrangement. For these cars the actual charges made by the warehouse were as follows:

Handling .....	\$268.19
Storage .....	172.35
Weighline .....	11.93
<hr/>	
Total .....	\$452.47

From these comparisons it will be seen that it cost the dealer in roofing paper very nearly \$100 per car to handle this paper



**CLASS FREIGHT RATES TO KANSAS CITY FROM SPECIFIED CITIES IN THE UNITED STATES EAST OF MISSISSIPPI RIVER**

FROM	IN CENTS PER 100 POUNDS																
	TO CHICAGO									TO MISSISSIPPI RIVER							
	Miles	1	2	3	4	5	6	R-25	R-26	1	2	3	4	5	6	R-25	R-26
Boston, Mass.	152½	157½	138½	105	73½	63	52½	117½	84	184	162½	123	86	71½	61½	138	98
New York, N.Y.	1334	157½	138½	105	73½	63	52½	117½	84	184	162½	123	86	71½	61½	138	98
Philadelphia, Pa.	1243	151½	132½	103	71½	61	50½	112½	82	178	156½	121	84	71½	59½	133	96½
Baltimore, Md.	1101	149½	130½	102	70½	60	49½	110½	81	175	154½	120	83	70½	58½	131	95½
Buffalo, N. Y.	780	106½	92	72½	54½	38	30½	78	58	139	115½	91	68	47½	48	98	73
Pittsburgh, Pa.	917	108½	92	72½	54½	38	30½	78	58	136	117½	91	68	47½	48	98	73
Cleveland, Ohio	810	94½	80½	63½	47½	33	26½	68½	51	115	97½	77	57½	40½	32	83½	61½
Cincinnati, Ohio	621	89½	76½	60	45	31½	25	65	48½	94½	80½	63	47½	33	24½	68½	50½
Detroit, Mich.	714	89	75	59	44	31	24½	63½	47	111½	95	74½	56	39	31	80½	59½

NOTE: Rates governed by ratings in Official Territory in Consolidated Classification No. 1.

	IN CENTS PER 100 POUNDS										
	Miles	1	2	3	4	5	A	B	C	D	E
Chicago	451	135	110	76½	54	46	54	46	37	31	27
Mississippi River		93	69½	54	49½	46	37	30½	25½	20½	17

(Proportional on Shipments Originating East of Indiana and Illinois State Line.)

NOTE: Governed by ratings in Western Territory of C. F. C. No. 1. To arrive at through rate, figure both Chicago and Mississippi River combination and use the cheaper rate.

NOTE: These rates compiled, being effective as of February 1st, 1921, and are subject to change under legal Tariffs on file with Interstate Commerce Commission

**CLASS FREIGHT RATES FROM KANSAS CITY, MISSOURI, TO SPECIFIED CITIES  
IN IOWA**

FROM KANSAS CITY TO	IN CENTS PER 100 POUNDS										
	Miles	1	2	3	4	5	A	B	C	D	E
Burlington . . . . .	320	118	93	67½	50	41	48	39	33	27	23
Council Bluffs . . . . .	194	101½	76½	59½	46	37	41	33	29	23	19
Cedar Rapids . . . . .	416	101½	76½	59½	46	37	41	33	29	23	19
Des Moines . . . . .	219	101½	76½	59½	46	37	41	33	29	23	19
Davenport . . . . .	335	101½	76½	59½	46	37	41	33	29	23	19
Fort Madison . . . . .	218	101½	76½	59½	46	37	41	33	29	23	19
Keokuk . . . . .	289	101½	76½	59½	46	37	41	33	29	23	19
Ottumwa . . . . .	206	101½	76½	59½	46	37	41	33	29	23	19
Osceola . . . . .	211	101½	76½	59½	46	37	41	33	29	23	19
Sioux City . . . . .	364	135	110	76½	54	46	54	46	37	31½	23

**CLASS FREIGHT RATES FROM KANSAS CITY, MISSOURI, TO SPECIFIED CITIES IN  
NEBRASKA**

FROM KANSAS CITY TO	IN CENTS PER 100 POUNDS										
	Miles	1	2	3	4	5	A	B	C	D	E
Allamore . . . . .	595	191	162	133½	115	85½	56	67	57½	48	32½
Omaha . . . . .	196	101½	76½	59½	46	37	41	33	29	23	19
Lincoln . . . . .	290	101½	76½	59½	46	37	41	33	29	23	17½
Grand Island . . . . .	316	135	115	94½	81	61	67½	47½	40½	34	25½
Hastings . . . . .	327	130½	110½	91	78½	58½	65	45	39	32½	22½
Beatrice . . . . .	211	101½	86½	71	61	46	50½	36	30½	23	17½
North Platte . . . . .	453	155½	132½	108½	93	70	77½	54½	46½	39	26½
Falls City . . . . .	85	74½	63½	52	44½	34	37	26½	22½	19	13

NOTE: These rates compiled, being effective as of February 1st, 1921, and are subject to change under legal tariffs on file with Interstate Commerce Commission.

FIG. 11

on a space-rental basis, as against a cost of less than \$60 per car as charged by the warehouse.

It will be further noted that the expense for handling eight cars on a space-rental basis would have been practically the same as twelve cars. This would have made the cost about \$150 per car.

#### **48. Distribution Through Central Warehouses.**

An example of the conditions favorable for the distribution of goods by use of long hauls to a warehouse for carload traffic and short hauls from the warehouse for less-than-carload traffic is presented in Fig. 9, which is taken from an advertisement describing the advantages of Kansas City as a distributing point. In this figure are shown the shortest railroad distances from Kansas City to various cities within its trade territory.

In Fig. 10 are shown class rates to Kansas City from cities east of the Mississippi River, and in Fig. 11 are shown class rates from Kansas City to some of the points indicated in Fig. 9. It should be borne in mind that most articles take a lower class rate when shipped in carloads. For example, rubber shoes in less-than-carload lots take a first-class rate, while in carloads they take a second-class rate.

For this reason, a Boston manufacturer selling rubber shoes in many of the cities shown in Fig. 9, might find it profitable to ship them in carloads at second-class rates to Kansas City and then distribute them in less-than-carload lots at first-class rates. The difference in cost between the two methods would be found as follows:

As shown in Fig. 10, the rate on a shipment of 100 pounds at first class from Boston to the Mississippi River is 184 cents; from the Mississippi River to Kansas City, as shown in the lower part of Fig. 10, the rate is 93 cents, and as shown in Fig. 11, the rate from Kansas City to Omaha is  $101\frac{1}{2}$  cents; then the total first-class rate from Boston to Omaha is  $184 + 93 + 101\frac{1}{2} = \$3.78\frac{1}{2}$  per 100 pounds.

If, however, the manufacturer would combine this 100-pound shipment with others to make a carload to be distributed from Kansas City, he would pay only second-class rates from Boston

**CLASS FREIGHT RATES TO KANSAS CITY FROM SPECIFIED CITIES IN THE  
UNITED STATES**

TO KANSAS CITY FROM	IN CENTS PER 100 POUNDS										
	Miles	1	2	3	4	5	A	B	C	D	E
Chicago, Illinois . . . . .	451	135	110	78½	54	46	54	46	37	31	27
Denver, Colorado . . . . .	636	194½	155½	125	101½	79½	94½	71	63	56	49½
Dallas, Texas . . . . .	592	214½	187½	162	150½	118	121½	110	90	69½	57½
Des Moines, Iowa . . . . .	219	101½	76½	50½	46	37	41	33	29	23	19
Galveston, Texas . . . . .	897	248½	211½	175½	162	137	133½	118	98	77½	66
Helena, Montana . . . . .	1200	350	302	250	210	175½	175½	140	116½	105½	92
Los Angeles, California . . . . .	1780	500	433½	366½	305½	266½	266½	205½	158½	155½	130
Little Rock, Arkansas . . . . .	492	185½	160½	125	106½	85	92	71	63	53½	44½
Minneapolis, Minnesota . . . . .	521	144	117	81	57½	47½	57½	47½	39	34	29
Memphis, Tennessee . . . . .	484	162	137½	113½	97	78½	83½	65	56½	48½	40½
Milwaukee, Wisconsin . . . . .	550	135	110	76½	54	46	54	46	37	31	27
New Orleans, Louisiana . . . . .	862	248½	211½	174	148½	119	129	100	87	74½	63
Omaha, Nebraska . . . . .	196	101½	76½	50½	46	37	41	33	29	23	17½
Portland, Oregon . . . . .	2128	500	433½	366½	305½	266½	266½	205½	158½	155½	142
St. Louis, Missouri . . . . .	282	101½	76½	50½	46	37	41	33	29	23	19
San Francisco, California . . . . .	2090	500	433½	366½	305½	266½	266½	205½	158½	155½	130

NOTE: These rates compiled, being effective as of February 1st, 1921, and are subject to change under legal tariffs on file with Interstate Commerce Commission.



to Kansas City, which, as shown in Fig. 10, would be  $162\frac{1}{2} + 69\frac{1}{2} = 232$  cents. From Kansas City to Omaha he would have to pay first-class rates, or  $101\frac{1}{2}$  cents, as before, and the total

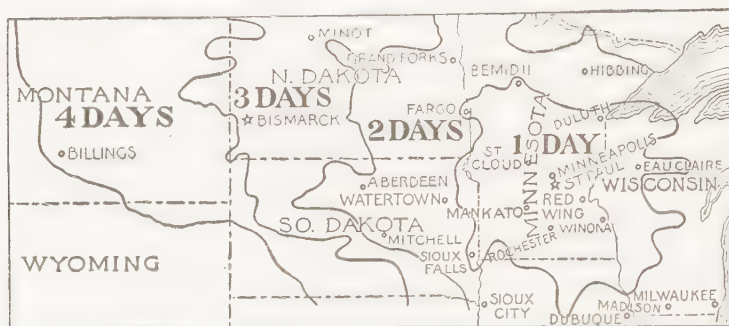


FIG. 13

cost of the shipment would be  $232 + 101\frac{1}{2} = \$3.33\frac{1}{2}$ , which is  $\$3.78\frac{1}{2} - \$3.33\frac{1}{2} = 45$  cents less per hundred pounds than by the direct-shipment method. Which method would be the

TABLE I

COMPARATIVE COSTS, PER 100 POUNDS, OF DISTRIBUTING SOAP AND SOAP PRODUCTS DIRECT FROM CHICAGO WITH COST OF DISTRIBUTING THROUGH THE MINNEAPOLIS TERMINAL WAREHOUSE

To	L. C. L. direct from Chicago	Distributed Through Minneapolis Terminal Warehouse Co.					
		Carload Chicago to Min- neapolis	L. C. L. from Minne- apolis	Ware- house hand- ling	Total	Saving	Normal Service from Minne- apolis *
	Cents	Cents	Cents	Cents	Cents	Cents	
St. Cloud, Minn.....	64.5	34	20.5	4.5	59	5.5	2 days
Bemidji, Minn.....	86.5	34	48	4.5	82.5	4	4 "
Detroit, Minn.....	86	34	42	4.5	80.5	5.5	4 "
Fargo, N. D.....	91	34	50	4.5	88.5	2.5	4 "
Grand Forks, N. D..	100	34	56	4.5	94.5	5.5	4 "
Bismarck, N. D.....	130.5	34	86.5	4.5	125	5.5	4 "
Minot, N. D.....	148.5	34	104.5	4.5	143	5.5	4 "
Billings, Mont.....	226.5	34	185.5	4.5	224	2.5	6 "

\*The time shown in this column is based on normal freight schedules and includes terminal time at distribution point.

cheaper would depend on the amount of business handled and the warehouse expense.

Similar calculations might be made in regard to shipments from the cities listed in Fig. 12. In each case, however, it would be necessary to refer to the Classification to find what, if any, difference there is in the classification of less-than-carload and carload lots.

**49. Warehouse Charges.**—Warehouse charges in connection with shipments must necessarily vary greatly according to the services rendered, but examples of actual charges in connection with the distribution of two different products are given in Tables I and II, which have been published by the Minneapolis Terminal Warehouse Co. These tables also show the relative advantages of the different methods of shipment.

TABLE II

COMPARATIVE COSTS, PER 100 POUNDS, OF DISTRIBUTING ENAMELED WARE FROM NEW KENSINGTON, THROUGH WAREHOUSE AT MINNEAPOLIS

To	L. C. L. direct from New Ken- sington  Cents	Distributed Through Minneapolis Warehouse					
		Carload New K. to Min- neapolis  Cents	L. C. L. from Minne- apolis  Cents	Ware- house hand- ling  Cents	Total  Cents	Saving  Cents	Normal Service from Minne- apolis *
St. Cloud, Minn.....	227	119½	40½	10	170	57	3 days
Glenwood, Minn.....	246½	119½	60	10	189½	57	3 "
Bemidji, Minn.....	265	119½	96½	10	226	39	4 "
Detroit, Minn.....	269½	119½	83	10	212½	57	4 "
Fargo, N. D.....	283	119½	96½	10	226	57	4 "
Grand Forks, N. D....	294½	119½	108	10	237½	57	4 "
Bismarck, N. D.....	355½	119½	160	10	298½	57	4 "
Minot, N. D.....	381	119½	194½	10	324	57	4 "
Billings, Mont.....	503	119½	316½	10	416	57	6 "
Great Falls, Mont....	520	119½	333½	10	463	57	7 "
Butte, Mont.....	533½	119½	350	10	479½	51	7 "
			Dray				
Minneapolis.....	186½	119½	10	10	139½	47	
St. Paul.....	186½	119½	17½	10	147	39½	

\*The time shown in this column is based on normal freight schedules and includes terminal time at distribution point; that is, the time is measured from first 7 A. M. after arrival of carload at Minnesota Transfer.

**50. Time Required for Effecting Delivery.**—While, as has been explained, the distance of the distributing point from the final destinations has an influence on freight rates, there is also another factor of importance which distance influences to some extent, and that is the time required for effecting delivery. Tables I and II show the normal time required for making delivery in different instances, and Fig. 13 shows the boundaries of regions within which deliveries from Minneapolis may be made in 1, 2, 3, or 4 days, respectively. From these boundaries, it will be evident that other factors than distance have great effect in determining the time required for making delivery.

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#### HOW TO CONSIGN CARS TO A WAREHOUSE

**51.** When cars are to be consigned to a warehouse, it is well to make definite arrangements as to details with the warehouseman in advance. Failure to do this often results in trouble, delay, and expense. In the absence of special arrangements, however, cars consigned by the following described method, which is recommended by a large warehouse company, can usually be handled promptly and satisfactorily.

Cars should be consigned to the concern for whose account the warehouse is to handle them and in care of the warehouse company and, if known at the time, the number of the warehouse or spur track on which they are to be delivered to should be given. This information enables the warehouse company to know for whose account the car is to be handled, when it is reported by the railway company on arrival.

Very often the warehouseman has not received notice of the shipment before arrival of the car, and when the car arrives the railroad car clerk, who reports the arrival, does not have the shipper's name at hand; therefore, if the car is consigned to the warehouse company, the warehouseman has no information from which to give instructions regarding place of delivery in case he operates more than one warehouse or handles some of his cars from team tracks, which is occasionally done in the case of pool or distribution cars.

Some warehouse companies operate several warehouses on spur tracks served by different railroads; and when the shipper notifies them that carload shipments are to be forwarded, the warehouse companies give the shipper full instructions as to how the cars should be billed and at which warehouse they will be received; they also instruct him to show on the bills of lading the name of the delivering railroad serving the particular warehouse for which the cars are intended.

Without this information on the bills of lading, the cars would arrive and be placed on the railroad hold track until disposition was given by the consignee; this often results in a switching and sometimes a demurrage charge which would not be the case if the car was properly billed.

The following is a preferred form of billing:

*Consigned to American Biscuit Company, care of Union Terminal Warehouse No. 7. Destination: Los Angeles, State of California. Route: RI, SP, Pacific Electric delivery. Car Initial: C&NW. Car Co.: 41144.*

As soon as the shipment is made, the bill of lading, or a copy of it, with a manifest or checking list attached, should be mailed to the warehouse company, and, if freight charges are prepaid, the amount prepaid should be shown on the bill of lading or the following notation should appear:

"The charges on this shipment will be collected from the shipper and should, therefore, be considered to be fully prepaid."

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## VARIETY OF SERVICES FURNISHED BY WAREHOUSES

**52.** Besides the furnishing of storage and attending to distribution matters as already described, public warehouses are offering a great variety of services, the nature and extent of which vary with the general policies of the warehouse offering them. Thus, a warehouse company in Boston attends to the fumigation of foreign cotton and cotton waste according to the regulations of the United States Government. The company also does sampling, weighing, etc., besides the usual warehouse service.

**53.** Another development of the use of public warehouses in distribution service is as follows:

In the preceding description of the method of distribution, it was assumed that the carloads to be distributed were made up of separate lots of goods that had already been sold before the carload was shipped. A recent development in distribution methods is to have the warehouse carry a stock of goods and to place orders with the warehouse instead of placing the orders with and shipping them from the point of production. Thus, by filling the order from the warehouse nearest the customer, prompt delivery is secured and the seller at some distance from the customer is put more nearly on an equality with others much nearer.

**54.** In addition to the services already mentioned, some warehouse companies, since they have become so closely connected with the transportation business, have developed traffic departments which not only take care of such transportation matters as directly affect the warehouse business, but also serve their patrons in a very helpful way.

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#### COOPERATION OF SHIPPERS AND WAREHOUSEMEN

**55.** The development of warehouse distribution very soon made it apparent that the shippers and the warehousemen had many interests for the promotion of which an organization would be helpful. The warehousemen had organizations such as the American Warehousemen's Association devoted to their interests, but the shippers were without such organization until the formation of the Shippers' Warehousing and Distributing Association, at Chicago. This organization is made up of manufacturers who distribute products through public merchandise warehouses, and its principal object is stated to be "the standardization of documents and practices in the business relationship between shipper and warehouseman, with a view to effecting the maximum of economy in the routing of goods from the factory to the retailer and consumer."



**56.** One development in the line of standardization is the form shown in Fig. 14 (*a*) and (*b*), which was devised by a committee representing the two previously mentioned associations.

When the shipper's manifest is received, five of these forms are filled out at one time on a typewriter by use of carbons, the data being the same on all, though the headings vary slightly so that the different copies can be used for the following purposes: (1) Office copy, (2) customer's report of condition, (3) bill for services, (4) and (5) warehouse copies.

Other information is then added to each copy as the handling of the shipment progresses until the unloading of the car is completed, when the shipper's Report of Condition can be immediately forwarded to him, and the other copies will furnish all the necessary records for the warehouse.

**57.** The limitations and possibilities of warehousing in relation to distribution as they affect the public, are being studied by a number of agencies, and one of these, which it is expected will be a medium for giving publicity to the developments in the business, is the Domestic Distribution Department of the United States Chamber of Commerce. Information as to warehousing facilities at some specified point may be secured in various ways. Generally, the warehousemen at the point of shipment can give information as to reliable warehouses at other points, also much information may be derived from the magazine, *Distribution and Warehousing*, issued at 239 West 39th Street, New York City, this publication being devoted to the subjects indicated by its name.



# FREIGHT TARIFFS, ROUTING, AND TRACING

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## TARIFFS

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### USE OF TARIFFS

**1. Tariffs as Transportation Price Lists.**—The price list for transportation of freight is generally issued in the form of a publication called a tariff. Fig. 1 is a page from a typical freight tariff showing rates on the Great Northern Railway between Spokane, Wash., and various points in Montana.

**2. Application of Tariffs.**—Since no goods are mentioned by name in Fig. 1, the question would naturally arise as to how it would be possible, by use of such a tariff, to find the freight charges on some definite shipment, as, for example, 500 pounds of dry goods from Spokane, Wash., to Billings, Mont.

The explanation is, that the numbers and letters at the heads of the columns in Fig. 1 refer to classes in the Consolidated Freight Classification, in which it will be found that dry goods take a Class 1 rate. Fig. 1 shows that the first-class rate between Spokane and Billings is  $\$1.87\frac{1}{2}$  per 100 pounds; therefore, the charges for 500 pounds of dry goods would be  $5 \times \$1.87\frac{1}{2} = \$9.38$ .

A tariff such as that shown in Fig. 1, in which rates are quoted according to classes, is called a *class tariff*.

**3.** Most rates are published as applying between specified points, as in the case of Fig. 1, but in a smaller number of cases the rates are published as applying for specified distances, as is

## SECTION I—Continued.

CLASS RATES—In Cents Per 100 Lbs.												
Index No.	Between SPOKANE, WASH. And	Great Northern Ry.—Cont.										
		1	2	3	4	5	A	B	C	D	E	
216	*Vehar											
217	Cushman											
218	Belmont											
219	*Painted Robe											
220	Broadview											
221	Conanache											
222	Acton											
223	*Shorey	187½	160	131½	112½	94	94	75	50½	47½	37½	79½
224	*Rimroek											75
225	Hesper											
226	Mossmain											
227	Billings											
228	*Goodman											
229	*Riceville	176½	150	124	106½	89	89	70	52½	44	35	75½
230	*Albright	177½	151½	124	106½	89	89	71½	54	45	35	75½
231	*Logging Creek	179	152½	125	107½	90	90	71½	54	45	35½	76½
232	Monarch	180	152½	126	107½	90	90	72½	54	45	36½	76½
233	*Wellwood Spur	181½	154	127½	109	91	91½	72½	55	45	36½	77½
234	Nellart	182½	155	127½	110	91½	91½	72½	55	45	36½	77½
235	*Gibson											
236	*Rainbow	170	145	119	102½	85	85	67½	51½	42½	34	72½
237	*Goodale	171½	145	120	102½	86½	86½	69	51½	42½	34	72½
238	Portage	172½	145	121½	104	86½	86½	70	51½	44	35	73½
239	*Flowerce	174	147½	121½	104	87½	87½	70	52½	44	35	74½
240	Carter	175	149	122½	105	87½	87½	70	52½	44	35	74½
241	*Tunis	176½	150	124	106½	89	89	70	52½	44	35	75½
242	*Kershaw	177½	151½	124	106½	89	89	71½	54	45	35	75½
243	Benton	179	152½	125	107½	90	90	71½	54	45	36½	76½

\*No Agent. Freight charges must be prepaid.

FIG. 1

**CLASS RATES**  
(See Item No. 25)  
**IN CENTS PER 100 POUNDS.**

Item No. 155.

MILES	CLASSES									
	1st Class	2nd Class	3rd Class	4th Class	5th Class	Class A	Class B	Class C	Class D	Class E
10 and under	39	32½	30½	29	23½	23½	19	15½	13½	12
15 and over 10	42½	37	32½	30½	25½	25½	20½	19	15½	13½
20 and over 15	47½	39	34	32½	27	27	22½	20½	16	13½
25 and over 20	50½	42½	39	34	29	29	25½	22½	17½	15½
30 and over 25	57½	47½	42½	36	30½	30½	29	23½	19½	15½
35 and over 30	63	50½	46	37	34	34	32½	25½	21	17
40 and over 35	67½	54	49½	40½	37	37	36	27	23	17
45 and over 40	71	59½	52½	44	40½	40½	39	29	24½	19
50 and over 45	76½	63	56½	47½	44	44	42½	30½	26½	19
55 and over 50	79½	66	59½	50½	47½	47½	44	32½	27½	20½
60 and over 55	83	67½	61	54	50½	50½	46	34	29½	20½
65 and over 60	86½	71	66	57½	53½	53½	47½	36	30½	22½
70 and over 65	90	74½	69½	61	54	54	49½	37	32½	22½
75 and over 70	93	77½	73	63	56	56	50½	39	32½	23½
80 and over 75	96½	81	76½	64	57½	57½	52½	40½	34	23½
85 and over 80	100	84½	77½	66	59½	59½	54	42½	34	25½
90 and over 85	103½	88	79½	69½	61	63	56	44	36	25½
95 and over 90	104½	91	81	71	63	64	57½	46	36	27
100 and over 95	108	94½	83	74½	64	66	58½	47½	36½	27
110 and over 100	115	100	94½	88	67½	71	63	50½	39	29
120 and over 110	121½	104½	101½	94½	71	73	66	52½	40½	30½
130 and over 120	128½	110	104½	96½	73	74½	67½	56	44	32½

For explanation of Abbreviations and Reference Marks, see Item No. 1.

FIG. 2

# ST. LOUIS SOUTHWESTERN RAILWAY.

DISTANCES IN MILES AND TENTHS OF MILES BETWEEN.  
(For short line distances between Junction Points, see page 12)

AND STATIONS																	
		Birds Point, Mo.	Brinkley, Ark.	Camden, Ark.	Delta, Mo.	Fair Oaks, Ark.	Fordyce, Ark.	Ilmo, Mo.	Jonesboro, Ark.	Malden, Mo.	*North Little Rock, Little Rock, Ark.	Paragould, Ark.	Pine Bluff, Ark.	Shreveport, La.	Texas, Ark. Tex.	Valley Jct., Ill.	Junctions Shown.
BIRDS POINT BRANCH																	
— Concluded.																	
50	*Crumpecker	Mo	50 <sup>1</sup>	147 <sup>1</sup>	285 <sup>1</sup>	58 <sup>1</sup>	121 <sup>1</sup>	255 <sup>1</sup>	71 <sup>1</sup>	73 <sup>1</sup>	6 <sup>1</sup>	232 <sup>1</sup>	52 <sup>1</sup>	215 <sup>1</sup>	399 <sup>1</sup>	367 <sup>1</sup>	195 <sup>1</sup>
50	*Melby	Mo	51 <sup>1</sup>	147 <sup>1</sup>	284 <sup>1</sup>	57 <sup>1</sup>	120 <sup>1</sup>	254 <sup>1</sup>	70 <sup>1</sup>	73 <sup>1</sup>	5 <sup>1</sup>	232 <sup>1</sup>	51 <sup>1</sup>	215 <sup>1</sup>	399 <sup>1</sup>	366 <sup>1</sup>	194 <sup>1</sup>
50	*Nordlaw	Mo	52 <sup>1</sup>	146 <sup>1</sup>	284 <sup>1</sup>	56 <sup>1</sup>	120 <sup>1</sup>	254 <sup>1</sup>	69 <sup>1</sup>	72 <sup>1</sup>	5 <sup>1</sup>	231 <sup>1</sup>	50 <sup>1</sup>	214 <sup>1</sup>	398 <sup>1</sup>	366 <sup>1</sup>	193 <sup>1</sup>
50	*Turners	Mo	53 <sup>1</sup>	144 <sup>1</sup>	282 <sup>1</sup>	55 <sup>1</sup>	118 <sup>1</sup>	252 <sup>1</sup>	68 <sup>1</sup>	70 <sup>1</sup>	3 <sup>1</sup>	229 <sup>1</sup>	49 <sup>1</sup>	212 <sup>1</sup>	396 <sup>1</sup>	364 <sup>1</sup>	192 <sup>1</sup>
50	*Broadwater	Mo	54 <sup>1</sup>	144 <sup>1</sup>	282 <sup>1</sup>	54 <sup>1</sup>	118 <sup>1</sup>	252 <sup>1</sup>	67 <sup>1</sup>	70 <sup>1</sup>	3 <sup>1</sup>	229 <sup>1</sup>	48 <sup>1</sup>	212 <sup>1</sup>	396 <sup>1</sup>	364 <sup>1</sup>	191 <sup>1</sup>
50	*Wayne	Mo	56 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	0 <sup>1</sup>	226 <sup>1</sup>	46 <sup>1</sup>	209 <sup>1</sup>	393 <sup>1</sup>	361 <sup>1</sup>	189 <sup>1</sup>
MAIN LINE Continued.																	
50	*CAMPBELL	Mo	64 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	7 <sup>1</sup>	218 <sup>1</sup>	42 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*St Francis	Ark	66 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	11 <sup>1</sup>	214 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*PIGGOTT	Ark	68 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	17 <sup>1</sup>	212 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Greenway	Ark	70 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	23 <sup>1</sup>	210 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Hammett	Ark	72 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	29 <sup>1</sup>	208 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Pratt	Ark	74 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	35 <sup>1</sup>	206 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Rector	Ark	76 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	41 <sup>1</sup>	204 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Marmaduke	Ark	78 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	47 <sup>1</sup>	202 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Hallsdale	Ark	80 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	53 <sup>1</sup>	200 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*PARAGOULD	Ark	82 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	59 <sup>1</sup>	198 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
BLYTHERVILLE BRANCH																	
50	*Blytheville	Ark	84 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	65 <sup>1</sup>	196 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Hargrove	Mo	86 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	71 <sup>1</sup>	194 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Cardwell	Mo	88 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	77 <sup>1</sup>	192 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*AREYD	Mo	90 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	83 <sup>1</sup>	190 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Hollywood	Mo	92 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	89 <sup>1</sup>	188 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Cove	Mo	94 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	95 <sup>1</sup>	186 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*HORNEVILLE	Mo	96 <sup>1</sup>	141 <sup>1</sup>	279 <sup>1</sup>	52 <sup>1</sup>	115 <sup>1</sup>	249 <sup>1</sup>	65 <sup>1</sup>	67 <sup>1</sup>	101 <sup>1</sup>	184 <sup>1</sup>	43 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	357 <sup>1</sup>	195 <sup>1</sup>
50	*Calumet	Ark	135 <sup>1</sup>	128 <sup>1</sup>	265 <sup>1</sup>	120 <sup>1</sup>	101 <sup>1</sup>	235 <sup>1</sup>	142 <sup>1</sup>	54 <sup>1</sup>	78 <sup>1</sup>	213 <sup>1</sup>	32 <sup>1</sup>	141 <sup>1</sup>	287 <sup>1</sup>	445 <sup>1</sup>	264 <sup>1</sup>
50	*Gosnell	Ark	140 <sup>1</sup>	133 <sup>1</sup>	270 <sup>1</sup>	134 <sup>1</sup>	106 <sup>1</sup>	240 <sup>1</sup>	147 <sup>1</sup>	59 <sup>1</sup>	83 <sup>1</sup>	218 <sup>1</sup>	37 <sup>1</sup>	201 <sup>1</sup>	385 <sup>1</sup>	452 <sup>1</sup>	271 <sup>1</sup>
MAIN LINE—Continued.																	
50	*Bethel	Ark	108 <sup>1</sup>	90 <sup>1</sup>	227 <sup>1</sup>	102 <sup>1</sup>	63 <sup>1</sup>	197 <sup>1</sup>	115 <sup>1</sup>	16 <sup>1</sup>	50 <sup>1</sup>	175 <sup>1</sup>	5 <sup>1</sup>	158 <sup>1</sup>	341 <sup>1</sup>	399 <sup>1</sup>	230 <sup>1</sup>
50	*Aetna	Ark	112 <sup>1</sup>	85 <sup>1</sup>	223 <sup>1</sup>	106 <sup>1</sup>	59 <sup>1</sup>	193 <sup>1</sup>	119 <sup>1</sup>	11 <sup>1</sup>	55 <sup>1</sup>	170 <sup>1</sup>	9 <sup>1</sup>	153 <sup>1</sup>	345 <sup>1</sup>	395 <sup>1</sup>	233 <sup>1</sup>
50	*Brookland	Ark	115 <sup>1</sup>	83 <sup>1</sup>	220 <sup>1</sup>	109 <sup>1</sup>	57 <sup>1</sup>	191 <sup>1</sup>	123 <sup>1</sup>	9 <sup>1</sup>	57 <sup>1</sup>	168 <sup>1</sup>	12 <sup>1</sup>	151 <sup>1</sup>	348 <sup>1</sup>	398 <sup>1</sup>	236 <sup>1</sup>
50	*Glendale	Ark	120 <sup>1</sup>	78 <sup>1</sup>	215 <sup>1</sup>	114 <sup>1</sup>	52 <sup>1</sup>	186 <sup>1</sup>	127 <sup>1</sup>	4 <sup>1</sup>	62 <sup>1</sup>	163 <sup>1</sup>	17 <sup>1</sup>	148 <sup>1</sup>	353 <sup>1</sup>	398 <sup>1</sup>	241 <sup>1</sup>
50	*JONESBORO	Ark	124 <sup>1</sup>	74 <sup>1</sup>	211 <sup>1</sup>	118 <sup>1</sup>	47 <sup>1</sup>	181 <sup>1</sup>	131 <sup>1</sup>	6 <sup>1</sup>	67 <sup>1</sup>	159 <sup>1</sup>	21 <sup>1</sup>	142 <sup>1</sup>	358 <sup>1</sup>	398 <sup>1</sup>	245 <sup>1</sup>
50	*Gulkerson	Ark	131 <sup>1</sup>	67 <sup>1</sup>	204 <sup>1</sup>	125 <sup>1</sup>	41 <sup>1</sup>	175 <sup>1</sup>	138 <sup>1</sup>	6 <sup>1</sup>	73 <sup>1</sup>	152 <sup>1</sup>	28 <sup>1</sup>	135 <sup>1</sup>	363 <sup>1</sup>	398 <sup>1</sup>	252 <sup>1</sup>
50	*Gibson	Ark	132 <sup>1</sup>	65 <sup>1</sup>	203 <sup>1</sup>	126 <sup>1</sup>	39 <sup>1</sup>	173 <sup>1</sup>	139 <sup>1</sup>	8 <sup>1</sup>	75 <sup>1</sup>	150 <sup>1</sup>	29 <sup>1</sup>	133 <sup>1</sup>	365 <sup>1</sup>	398 <sup>1</sup>	253 <sup>1</sup>
50	*Otwell	Ark	136 <sup>1</sup>	61 <sup>1</sup>	199 <sup>1</sup>	131 <sup>1</sup>	35 <sup>1</sup>	169 <sup>1</sup>	143 <sup>1</sup>	12 <sup>1</sup>	79 <sup>1</sup>	146 <sup>1</sup>	34 <sup>1</sup>	129 <sup>1</sup>	371 <sup>1</sup>	398 <sup>1</sup>	257 <sup>1</sup>
50	*Brainerd	Ark	140 <sup>1</sup>	58 <sup>1</sup>	195 <sup>1</sup>	134 <sup>1</sup>	31 <sup>1</sup>	165 <sup>1</sup>	147 <sup>1</sup>	15 <sup>1</sup>	82 <sup>1</sup>	143 <sup>1</sup>	37 <sup>1</sup>	126 <sup>1</sup>	376 <sup>1</sup>	398 <sup>1</sup>	261 <sup>1</sup>
50	*Shelby	Ark	141 <sup>1</sup>	57 <sup>1</sup>	194 <sup>1</sup>	135 <sup>1</sup>	30 <sup>1</sup>	164 <sup>1</sup>	148 <sup>1</sup>	16 <sup>1</sup>	84 <sup>1</sup>	140 <sup>1</sup>	40 <sup>1</sup>	123 <sup>1</sup>	378 <sup>1</sup>	398 <sup>1</sup>	262 <sup>1</sup>
50	*Weiner	Ark	145 <sup>1</sup>	53 <sup>1</sup>	191 <sup>1</sup>	139 <sup>1</sup>	27 <sup>1</sup>	161 <sup>1</sup>	151 <sup>1</sup>	20 <sup>1</sup>	87 <sup>1</sup>	138 <sup>1</sup>	42 <sup>1</sup>	121 <sup>1</sup>	383 <sup>1</sup>	398 <sup>1</sup>	266 <sup>1</sup>
50	*Waldenburg	Ark	149 <sup>1</sup>	49 <sup>1</sup>	187 <sup>1</sup>	143 <sup>1</sup>	23 <sup>1</sup>	157 <sup>1</sup>	155 <sup>1</sup>	24 <sup>1</sup>	91 <sup>1</sup>	134 <sup>1</sup>	46 <sup>1</sup>	117 <sup>1</sup>	388 <sup>1</sup>	398 <sup>1</sup>	270 <sup>1</sup>
50	*Fisher	Ark	154 <sup>1</sup>	43 <sup>1</sup>	181 <sup>1</sup>	148 <sup>1</sup>	17 <sup>1</sup>	151 <sup>1</sup>	161 <sup>1</sup>	30 <sup>1</sup>	97 <sup>1</sup>	128 <sup>1</sup>	51 <sup>1</sup>	111 <sup>1</sup>	393 <sup>1</sup>	398 <sup>1</sup>	274 <sup>1</sup>
50	*Pittinger	Ark	158 <sup>1</sup>	40 <sup>1</sup>	177 <sup>1</sup>	152 <sup>1</sup>	14 <sup>1</sup>	148 <sup>1</sup>	165 <sup>1</sup>	33 <sup>1</sup>	100 <sup>1</sup>	125 <sup>1</sup>	55 <sup>1</sup>	108 <sup>1</sup>	398 <sup>1</sup>	398 <sup>1</sup>	278 <sup>1</sup>
50	*Hickory Ridge	Ark	161 <sup>1</sup>	37 <sup>1</sup>	175 <sup>1</sup>	155 <sup>1</sup>	11 <sup>1</sup>	145 <sup>1</sup>	168 <sup>1</sup>	36 <sup>1</sup>	103 <sup>1</sup>	122 <sup>1</sup>	58 <sup>1</sup>	105 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	282 <sup>1</sup>
50	*Dalby	Ark	163 <sup>1</sup>	34 <sup>1</sup>	172 <sup>1</sup>	157 <sup>1</sup>	8 <sup>1</sup>	142 <sup>1</sup>	170 <sup>1</sup>	39 <sup>1</sup>	106 <sup>1</sup>	119 <sup>1</sup>	60 <sup>1</sup>	102 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	284 <sup>1</sup>
50	*Ferguson	Ark	164 <sup>1</sup>	33 <sup>1</sup>	171 <sup>1</sup>	158 <sup>1</sup>	7 <sup>1</sup>	141 <sup>1</sup>	171 <sup>1</sup>	40 <sup>1</sup>	107 <sup>1</sup>	118 <sup>1</sup>	61 <sup>1</sup>	101 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	285 <sup>1</sup>
50	*Ferguson	Ark	167 <sup>1</sup>	30 <sup>1</sup>	168 <sup>1</sup>	161 <sup>1</sup>	4 <sup>1</sup>	138 <sup>1</sup>	174 <sup>1</sup>	43 <sup>1</sup>	110 <sup>1</sup>	115 <sup>1</sup>	64 <sup>1</sup>	98 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	288 <sup>1</sup>
50	*FAIR OAKS	Ark	169 <sup>1</sup>	28 <sup>1</sup>	166 <sup>1</sup>	163 <sup>1</sup>	2 <sup>1</sup>	136 <sup>1</sup>	176 <sup>1</sup>	45 <sup>1</sup>	112 <sup>1</sup>	113 <sup>1</sup>	66 <sup>1</sup>	96 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	290 <sup>1</sup>
50	*Fair Oaks	Ark	171 <sup>1</sup>	26 <sup>1</sup>	163 <sup>1</sup>	165 <sup>1</sup>	1 <sup>1</sup>	134 <sup>1</sup>	178 <sup>1</sup>	47 <sup>1</sup>	114 <sup>1</sup>	114 <sup>1</sup>	68 <sup>1</sup>	94 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	292 <sup>1</sup>
50	*Fair Oaks	Ark	172 <sup>1</sup>	25 <sup>1</sup>	162 <sup>1</sup>	166 <sup>1</sup>	0 <sup>1</sup>	133 <sup>1</sup>	179 <sup>1</sup>	48 <sup>1</sup>	115 <sup>1</sup>	115 <sup>1</sup>	69 <sup>1</sup>	93 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	293 <sup>1</sup>
50	*Fair Oaks	Ark	173 <sup>1</sup>	24 <sup>1</sup>	161 <sup>1</sup>	167 <sup>1</sup>	0 <sup>1</sup>	132 <sup>1</sup>	180 <sup>1</sup>	49 <sup>1</sup>	116 <sup>1</sup>	116 <sup>1</sup>	70 <sup>1</sup>	92 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	294 <sup>1</sup>
50	*Fair Oaks	Ark	174 <sup>1</sup>	23 <sup>1</sup>	160 <sup>1</sup>	168 <sup>1</sup>	0 <sup>1</sup>	131 <sup>1</sup>	181 <sup>1</sup>	50 <sup>1</sup>	117 <sup>1</sup>	117 <sup>1</sup>	71 <sup>1</sup>	91 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	295 <sup>1</sup>
50	*Fair Oaks	Ark	175 <sup>1</sup>	22 <sup>1</sup>	159 <sup>1</sup>	169 <sup>1</sup>	0 <sup>1</sup>	130 <sup>1</sup>	182 <sup>1</sup>	51 <sup>1</sup>	118 <sup>1</sup>	118 <sup>1</sup>	72 <sup>1</sup>	90 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	296 <sup>1</sup>
50	*Fair Oaks	Ark	176 <sup>1</sup>	21 <sup>1</sup>	158 <sup>1</sup>	170 <sup>1</sup>	0 <sup>1</sup>	129 <sup>1</sup>	183 <sup>1</sup>	52 <sup>1</sup>	119 <sup>1</sup>	119 <sup>1</sup>	73 <sup>1</sup>	89 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	297 <sup>1</sup>
50	*Fair Oaks	Ark	177 <sup>1</sup>	20 <sup>1</sup>	157 <sup>1</sup>	171 <sup>1</sup>	0 <sup>1</sup>	128 <sup>1</sup>	184 <sup>1</sup>	53 <sup>1</sup>	120 <sup>1</sup>	120 <sup>1</sup>	74 <sup>1</sup>	88 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	298 <sup>1</sup>
50	*Fair Oaks	Ark	178 <sup>1</sup>	19 <sup>1</sup>	156 <sup>1</sup>	172 <sup>1</sup>	0 <sup>1</sup>	127 <sup>1</sup>	185 <sup>1</sup>	54 <sup>1</sup>	121 <sup>1</sup>	121 <sup>1</sup>	75 <sup>1</sup>	87 <sup>1</sup>	399 <sup>1</sup>	398 <sup>1</sup>	299 <sup>1</sup>
50	*Fair Oaks	Ark	179 <sup>1</sup> </														

shown in Fig. 2. When the latter method is used, it is necessary to provide some form of distance table, of which Fig. 3 is an example, as a means of determining the distance between two specified points. The fact that rates are published as applying between specified points does not necessarily mean that distance has not had some influence in fixing the rates, but it does mean that the user of the tariff does not have to concern himself with distances, because he has the rates between the points. Rates applicable according to distance are generally published to be used only if there are no rates published to apply between specified points.

4. A vast amount of traffic moves on rates that are published without regard to the rates which would apply under the provisions of the Classification. Such rates are called *commodity* rates and the publication carrying them is called a commodity tariff. Fig. 4 is an illustration of rates on miscellaneous commodities, as published in commodity tariffs. It will be noted that these rates apply directly to specified commodities, which removes the necessity of referring to the Classification to find the class to which an article is assigned. Large quantities of lumber, coal, packing-house products, and many other articles move on commodity rates from the point of production to the point of consumption, and commodity rates, therefore, play an important part in domestic traffic. For example, practically all coal moving from the Pennsylvania coal fields to New York and other points of consumption moves on commodity rates.

The relations between class tariffs and commodity tariffs are made plain by the following:

1. Commodity rates are usually, but not always, lower than class rates.

2. Class rates and commodity rates may be published in the same or in different tariffs, the tendency being to include both kinds of rates in one publication where conditions warrant it.

When there is a class rate and a commodity rate on the same traffic, the commodity rate will govern, unless both rates are in the same tariff, and provision is made therein that the lowest

**SECTION 2—Continued.**

Item No.	COMMODITY	APPLYING	RATES In Cents per 100 lbs., except as otherwise specified.
345	<b>Syrup</b> (not including fruit Spray) <b>Molasses; Glucose</b> (in barrels) <b>Glucose Jelly</b> (in barrels, kegs, kits or pails) minimum weight 36,000 lbs.....	FROM Spokane..... Wash. TO Great Falls..... Mont.	81½
350	<b>Tallow, C. L.</b> , minimum weight 26,000 lbs. Rates named in this item are terminal rates only and will not apply to or from intermediate points	FROM Anaconda..... Mont. Boulder..... " Butte..... " Dawson..... " Durant..... " Gregson..... " Jefferson..... " Nissler..... " Roeder..... " Silica..... " Silver Bow..... " Stanton..... " TO Spokane..... Wash.	62½
355	<b>Tallow, C. L.</b> , minimum weight 60,000 lbs. Rates named in this item are terminal rates only and will not apply to or from intermediate points.	FROM Spokane..... Wash. TO Helena..... Mont.	44
360	<b>Tallow, Grease, Hides and Sheep Pelts,</b> <b>Green, C. L.</b> , minimum weight 36,000 lbs.	BETWEEN Butte..... Mont. Helena..... " AND Spokane..... Wash.	67½
365	<b>Terra Cotta</b> , building, in barrels, boxes or crates; or when shipped loose must be packed in sufficient excelsior, hay, straw or similar packing material to prevent breakage. Carloads, minimum weight 40,000 lbs.....	FROM Spokane..... Wash. TO Billings..... Mont.	52
370	<b>Vinegar</b> , in Wood, minimum weight 30,000 lbs. (G-1705.)	FROM Spokane..... Wash. TO Great Falls..... Mont.	75
375	<b>Wire, Copper</b> , plain; in coils or on reels, or in barrels, boxes, or tubs, Carloads, mini- mum weight 50,000 lbs.....	FROM Black Eagle..... Mont. TO Spokane..... Wash.	95
380	<b>Whiskey</b> , carloads, minimum weight 30,- 000 lbs. (G. 2365)	FROM Manchester..... Mont. TO Spokane..... Wash.	125

rate will govern, whether it be a class rate or a commodity rate. Such a provision is made by the use of a clause such as is shown in the following quotation from a tariff:

#### SECTION 2. COMMODITY RATES

If the rates in Section 1 or 3 of this tariff make a lower charge on any shipment than the Rates in Section 2 of this tariff, the rates in Section 1 or 3 will be applied.

Tariffs carrying both class and commodity rates are called *class and commodity* tariffs.

3. Commodity tariffs are almost always subject to classification provisions to some extent, although the rates may be made entirely without regard to the class to which the article is assigned in the Classification. For example, the tariff may refer to the Classification for the specifications regarding packing requirements or carload weights.

4. Commodity tariffs generally apply only in one direction. This is due to the fact that commodity rates are issued to meet certain conditions that are applicable only in one direction. For example, commodity rates on coal are established from the mines to points of consumption, and it is only in very rare cases that coal is shipped to points where it is being produced.

5. While reference has been made to tariffs as price lists of transportation charges, it must be understood that tariffs not only carry rates, but also other information which has an influence on the amount of charges that will have to be paid on a shipment. In fact, many tariffs carry no rates, but carry rules and regulations that are applicable to specified traffic under specified conditions. For example, a tariff may carry packing requirements on certain commodities, and the manner in which the provisions in that tariff are carried out may have an important bearing on the charges that will be collected on the shipment.

Fig. 5 shows a portion of a tariff that does not carry transportation rates, but the provisions shown would affect charges. There is a great variety of such tariffs.



Rule													
29	<p align="center"><b>Allowances for Loading or Unloading Lighters, Barges or Cars on Floats</b></p> <p>An allowance for actual cost, not to exceed 12 cents per net or gross ton as rated, may be made to consignors or consignees within lighterage limits (see Rule 11), for loading or unloading "lighterage free" freight to or from Pennsylvania Railroad lighters or barges, when such service is performed by consignors or consignees.</p> <p>Shippers or consignees at points beyond lighterage limits (see Rule 11) must, where required, furnish all labor necessary to load or unload lighters or barges, or cars on floats, for which service an allowance of 12 cents per ton, subject to minimum of \$2.00 per car, will be made.</p>												
30	<p align="center"><b>Employment of Additional Equipment in Handling Heavy and Bulk Freight Westbound</b></p> <p>All westbound traffic except the heavy and bulky articles as enumerated below and designated in Rule 31, shall be handled by the Pennsylvania Railroad Company's own equipment.</p> <p>The articles, in bulk, which may be handled westbound by outside equipment, are as follows:</p> <table> <tr> <td>Brimstone</td><td>Salt</td></tr> <tr> <td>Clay</td><td>Scrap Iron</td></tr> <tr> <td>Iron Pyrites</td><td>Spent Oxide</td></tr> <tr> <td>Iron and Steel Rails, old</td><td>Spiegel Eisen</td></tr> <tr> <td>Magnesite</td><td>Spiegel Iron</td></tr> <tr> <td>Ores, all kinds</td><td>Sulphur</td></tr> </table> <p>in lots of 50 tons or over from each consignor and shipping point; the allowance on such articles to be 42 cents per ton, net or gross, as rated, for service of lightering only, or 60 cents per ton, net or gross as rated, if lightering, shoveling, hoisting and trimming in car is done at expense of the lighter.</p> <p>Borax or Boracic Acid, in bulk or in packages, in carloads, may be handled westbound by outside equipment, and an allowance of 3 cents per 100 pounds will be made.</p>	Brimstone	Salt	Clay	Scrap Iron	Iron Pyrites	Spent Oxide	Iron and Steel Rails, old	Spiegel Eisen	Magnesite	Spiegel Iron	Ores, all kinds	Sulphur
Brimstone	Salt												
Clay	Scrap Iron												
Iron Pyrites	Spent Oxide												
Iron and Steel Rails, old	Spiegel Eisen												
Magnesite	Spiegel Iron												
Ores, all kinds	Sulphur												
31	<p align="center"><b>Allowances, etc., to Outside Lighters for Lightering Heavy Articles</b></p> <p>The following are the maximum allowances per net or gross ton, as rated, to be made to outside lighters for handling heavy articles weighing 3 tons or over, to apply on both eastbound and westbound shipments, any balance of same shipment (pieces weighing less than 3 tons each) handled by outside lighter at the same time, may be paid for at regular lighterage rate, not exceeding 3 cents per 100 pounds.</p> <table> <tr> <td>Pieces weighing up to 3 tons.....</td><td>\$ .03 per 100 pounds.</td></tr> <tr> <td>" " over 3 " and up to 20 tons.....</td><td>1.00 per ton.</td></tr> <tr> <td>" " " 20 " " " 40 " .....</td><td>2.00 " "</td></tr> <tr> <td>" " " 40 " " " 50 " .....</td><td>3.50 " "</td></tr> </table> <p>Minimum payment for any one delivery containing single pieces weighing over 3 tons each..... 20.00</p> <p>Shipments of heavy articles, any piece of which weighs more than 50 tons, will be subject to such allowances as may be arranged for with the Pennsylvania Railroad Company in each particular case.</p> <p>Street Car Bodies or Street Cars, complete with trucks or motors, and empty Tank Cars, 3 cents per 100 pounds, plus \$15.00 per Street Car or Street Car Body, and empty Tank Car with a minimum of \$50.00 each, and above the regular lighterage allowance of 3 cents per 100 pounds for any one delivery in addition to extra towing charges beyond the free lighterage limits will be collected, when such service is performed. (See Rule 12)</p>	Pieces weighing up to 3 tons.....	\$ .03 per 100 pounds.	" " over 3 " and up to 20 tons.....	1.00 per ton.	" " " 20 " " " 40 " .....	2.00 " "	" " " 40 " " " 50 " .....	3.50 " "				
Pieces weighing up to 3 tons.....	\$ .03 per 100 pounds.												
" " over 3 " and up to 20 tons.....	1.00 per ton.												
" " " 20 " " " 40 " .....	2.00 " "												
" " " 40 " " " 50 " .....	3.50 " "												

## REGULATIONS GOVERNING THE ISSUING OF TARIFFS

6. For many years, tariffs have been issued by transportation companies; but until there was a regulating body having jurisdiction over the issuing of tariffs, it was not always possible to tell from the tariff under just what conditions traffic would be handled. Experience shows that when there was no regulating body there was a tendency for one or more of the following conditions to arise: (1) Tariffs would be issued, but abided by only to a limited extent. For example, it was often the case that the rates published in tariffs represented only the maximum rates that would be charged, as the carriers would make such rates as they had to in order to get the business, in many cases much lower than the published rates. (2) Tariffs would be interpreted as their *makers* saw fit, if any question was raised as to the meaning. (3) The tariffs would often not be open to the public, but would be used by the employes of the carriers for their own information. (4) To some extent, rates would be quoted without the use of anything in the form of a tariff.

Most domestic traffic is now subject to regulation by one or more of the following mentioned regulating bodies: The Interstate Commerce Commission, the United States Shipping Board, and the state regulating bodies. The important exception to the rule that domestic carriers are subject to regulation as to the making and publishing of rates is found in connection with certain water traffic, such as that which moves from the Atlantic to the Pacific coasts via the Panama Canal.

7. As the Interstate Commerce Commission has the best-developed methods of regulating the issuance of tariffs, the Shipping Board and the State regulating bodies have followed the first-mentioned body in their regulations. For this reason the following analysis of the tariffs is based upon tariffs constructed in accordance with the regulations of the Interstate Commerce Commission in a publication known as Tariff Circular 18-A. These regulations specify certain information that

Only one supplement to this tariff will  
be in effect at any time.

I. C. C. No. 3727  
Cancelled I. C. C. No. 30140

# UNITED STATES RAILROAD ADMINISTRATION

DIRECTOR GENERAL OF RAILROADS



## St. Louis Southwestern Railway

### LOCAL DISTANCE FREIGHT TARIFF No. 7120

(Cancels No. 5730)

APPLYING ON INTERSTATE SHIPMENTS

OF

## CLASSES AND COMMODITIES

BETWEEN

Stations on the St. Louis Southwestern Railway

IN

ARKANSAS, LOUISIANA AND MISSOURI

(EXCEPT AS PROVIDED IN ITEM No. 12)

Class rates shown in this tariff and supplements thereto may be used only when no specific class rates have been provided. Commodity rates shown in this tariff and supplements thereto may be used only when no specific commodity rates have been provided. These class rates may not be used either by themselves or in combination in preference to any specific class rate, nor may these commodity rates be used either by themselves or in combination in preference to any specific commodity rate.

Governed, except as otherwise provided herein, by Western Classification No. 55 (R. C. Fyfe's I. C. C. No. 13), supplements thereto and reissues thereof and by Exceptions to said Classification, Southwestern Lines' Classification Exceptions and Rules Circular No. 2-Q (F. A. Leland's I. C. C. No. 1198), supplements thereto and reissues thereof.

Owners will be required to load and unload all carload shipments moving at the rates provided in this tariff and supplements thereto. (File 13964.)

Rates shown in this tariff and supplements thereto are subject to the conditions of Carrier's Uniform Bill of Lading as shown in Western Classification No. 55 (R. C. Fyfe's I. C. C. No. 13) or reissues. (File 13207.)

EFFECTIVE OCTOBER 22, 1919.

Received, Posted  
and Recorded

G. S. TROWBRIDGE,  
Asst. General Freight Agent,  
St. L. S. W. Ry.,  
ST. LOUIS, MO.

Issued by J. P. FARE,  
General Freight Agent,  
St. L. S. W. Ry.,  
ST. LOUIS, MO.

(1000)

ST. LOUIS, MO., SEPTEMBER 17, 1919.

Mailed September 17, 1919.

File No. 14628-3

E. J. SCHUSTER PRINTING CO., ST. LOUIS.

FIG. 6

must be included in a tariff and prescribe the form in which some of it shall be stated, but the different tariffs present a considerable variety because they deal with varying kinds of traffic, and after the regulations or rules are complied with there is opportunity for a considerable amount of individuality.

The title page of a tariff contains much essential information relative to its contents; some of the things shown are as follows:

1. The title page must contain as complete information relative to the points between which the tariff applies as it is practicable to give in the limited space available. This information may be variously furnished by listing the states in which the tariff applies, by specifying the railroads on which points included in the tariff are located, or by the use of some general terms, such as "Eastern Points." The title page will sometimes serve its purpose by showing what traffic *is not* governed by it. For example, Fig. 6, which is a typical title page, shows that there are exceptions to the application of this tariff to stations on the St. Louis Southwestern, and refers to Item 12 in the tariff, where the exceptions are stated.

2. The kinds of rates that are included in the tariff are shown on the title page. Thus, in Fig. 6 it is stated that both class rates and commodity rates are included.

3. The date when the tariff became effective, or is to become effective is very essential information, which appears only on the title page. It would not have been lawful to use the tariff of which Fig. 6 is the title page, before October 22, 1919, the date shown near the bottom.

4. Every publication under the jurisdiction of the Interstate Commerce Commission must show in the upper right-hand corner what is known as the I. C. C. number. This number, which can be seen in Fig. 6, is the number given to the publication by the carrier or agent when he files it with the Interstate Commerce Commission. A tariff not bearing an I. C. C. number cannot be used in connection with traffic subject to the jurisdiction of the Commission.

5. Under the I. C. C. number must appear the number or numbers of the tariffs that are canceled by the present issue, as shown in Fig. 6. If there are so many canceled issues that

## 12 FREIGHT TARIFFS, ROUTING, AND TRACING §11

they cannot be listed on the title page, they may be shown in the body of the tariff, but specific reference must be made to them on the title page immediately under the I. C. C. number

TABLE OF CONTENTS	Page
Application of Rates .....	13
Class Rates (Specific) .....	20 to 33 Incl.
Commodity Rates .....	34 to 45 Incl.
Distance Rates .....	46 to 51 Incl.
Class Rates .....	46 to 49 Incl.
Commodity Rates .....	50 and 51
Exceptions to Western Classification .....	9 to 12 Incl.
Explanation of Technical Abbreviations.....	8
Index to Commodities .....	3
Index to Exceptions to Western Classification.....	3
Index to Stations from and to Which Rates Apply.....	4 to 7
List of Railway Abbreviations .....	2
Participating Carriers .....	2
Rules and Regulations .....	14 to 19 Incl.
Alternative Use of Rates .....	14
Analogous Articles .....	14
Capacities and Dimensions of Cars.....	14
Cement in Sacks, Estimated Weights on.....	14
Combination Rates .....	14
Combination Rates on Petroleum .....	14
Dunnage .....	15
Dunnage with Powder and High Explosives.....	15
Emigrants' Movables .....	15
Explosives, Weights on .....	15 and 16
Grain, Minimum Weights on .....	17 and 18
Heated Car Service .....	18
Less than Carload Shipments in Refrigerator or Heated Cars..	18
Minimum Class Rates .....	18
Minimum Charges .....	19
Minimum Class Scale for Continuous Through Movement.....	19
Minimum Weights .....	19
Preservatives .....	19
Stoves and Linings with Shipments of Fruits and Vegetables.	
Allowance for .....	19
Terminal and Other Charges .....	19

FIG. 7

of the tariff. Information relative to canceled issues is often essential, as in the case when it is desired to check old freight bills.

# LIST OF PARTICIPATING CARRIERS—Continued.

CARRIERS.	Concurrence.		CARRIERS.	Concurrence.	
	Form.	No.		Form.	No.
Fitzgerald, Ocilla & Broxton Railroad.....	①FX-6	36	Lehigh Valley Railroad.....	FX-8	43
(H. M. Atkinson S. L. Schoonmaker, Receivers.)	FX-6	10	Lexington & Eastern Railway.....	FX-6	18
Flint River & Northeastern Railroad.....	①FX-6	45	Lexington Terminal Railroad.....	①FX-6	28
Florida & Georgia Railway.....	FX-6	2	Liberty White Railroad.....	FX-6	6
Florida Central Railroad.....	FX-6	17	Licking River Railroad.....	FX-6	3
Florida East Coast Railway.....	FX-6	36	Litchfield & Madison Railway.....	FX-6	27
Florida Railway.....	②FX-6	34	Little River Railroad.....	②FX-6	56
Fort Wayne, Cincinnati & Louisville Railroad	FX-6	3	Live Oak, Perry & Gulf Railroad.....	①FX-6	36
Franklin & Abbeville Railroad.....	FX-6	3	Lorain & West Virginia Railway.....	FX-6	10
			Louisiana & Arkansas Railway.....	FX-6	16
Gainesville Midland Railway.....	FX-6	14	Louisiana & Northwest Railroad.....	FX-6	8
Georgetown & Western Railroad.....	②FX-6	36	Louisiana & Pacific Railway.....	⑤FX-6	11
(P. A. Wilcox, Receiver.)			Louisiana Railway & Navigation Co.....	FX-6	23
Georgia & Florida Railway.....	FX-6	18	Louisiana Western Railroad.....	FX-6	8
Georgia Coast & Piedmont Railroad.....	FX-6	9	Louisville & Nashville Railroad.....	FX-6	44
Georgia, Florida & Alabama Railway.....	FX-6	17	Louisville & Wadley Railroad.....	①FX-6	24
Georgia Northern Railway.....	③FX-6	24	Louisville, Henderson & St. Louis Railway.....	FX-6	23
Georgia Railroad.....	FX-6	30			
Georgia Southern & Florida Railway.....	FX-6	20	Macon & Birmingham Railway.....	FX-6	10
Georgia Southwestern & Gulf Railroad.....	FX-6	4	(J. B. Munson, Receiver.)		
Goodrich Transit Co.....	FX-6	20	Macoupin County Railway.....	FX-6	5
Grafton & Upton Railroad.....	FX-6	16	Macon, Dublin & Savannah Railroad.....	FX-6	19
Graham & Morton Transportation Co.....	FX-6	14	Madison Southern Railway.....	①FX-6	18
Grand Rapids & Indiana Railway.....	FX-6	26	Maine Central Railroad.....	FX-6	C-12
Grand Trunk Railway (East).....	FX-6	24	Manistee & Grand Rapids Railroad.....	FX-6	21
Grand Trunk Railway (West).....	FX-6	28	Manistee & North-Eastern Railroad.....	FX-6	20
Greenville & Knoxville Railway.....	FX-6	6	Manistique & Lake Superior Railroad.....	FX-6	4
Greenville Southern Railway Co.....	①FX-6	45	Mansfield Railway & Transportation Co.....	FX-6	26
Gulf & Sabine River Railroad.....	FX-6	4	Marietta, Columbus & Cleveland Railroad.....	FX-6	17
Gulf Line Railway.....	FX-6	81	Marquette, Tomahawk & Western Railway Co.....	FX-6	5
			Michigan Central Railroad.....	FX-6	36
Hampton & Branchville Railroad.....	②FX-6	36	Milltown Air Line Railway.....	②FX-6	36
Hartwell Railway.....	②FX-6	56	Minneapolis & St. Louis Railroad.....	FX-6	28
Havensville & Montgomery Railway.....	⑥FX-6	44	Minneapolis, St. Paul & Sault Ste. Marie Ry.....	FX-6	19
Hill Steamboat Line.....	FX-6	12	Mississippi Central Railroad.....	FX-6	20
Hocking Valley Railway.....	FX-6	29	Missouri, Kansas & Texas Ry. Co. of Texas.....	FX-8	27
Houston & Shreveport Railroad.....	FX-6	17	Monongahela Railroad.....	FX-6	3
			Monroe Railroad.....	①FX-6	28
Illinois Central Railroad.....	FX-6	37	Montour Railroad.....	FX-6	20
Illinois Southern Railway.....	FX-6	25	Montpelier & Wells River Railroad.....	FX-6	12
Illinois Terminal Railroad.....	FX-6	21	Morgan's Louisiana & Texas Railroad & Steamship Co.....	FX-6	11
Indiana Harbor Belt Railroad.....	FX-6	29	Mt. Airy & Eastern Railway.....	②FX-6	56
			(E. M. Wiley and J. A. Mills, Receivers.)		
Jamestown, Chautauqua & Lake Erie Railway.....	FX-6	19	Muscatine North & South Railway.....	FX-6	19
(Geo. Bullock, Receiver.)					
Kalamazoo, Lake Shore & Chicago Railway.....	FX-6	4	Nashville, Chattanooga & St. Louis Railway.....	FX-6	25
(Michigan United Traction Co., Lessee.)			Natchez, Columbia & Mobile Railway.....	FX-6	4
Kanawha & Michigan Railway.....	FX-6	26	New England Navigation Co.....	FX-6	13
Kansas City, Mexico & Orient Ry. Co. of Tex.....	FX-6	15	New Iberia & Northern Railroad.....	FX-6	3
(E. S. Hovey, M. L. Mertz, Receivers.)			New Jersey, Indiana & Illinois Railroad.....	FX-6	18
Kansas City Southern Railway.....	FX-6	18	New Orleans & Northeastern Railroad.....	FX-6	23
Kentwood & Eastern Railway.....	FX-6	7	New Orleans Great Northern Railroad.....	FX-6	22
Keweenaw, Green Bay & Western Railroad.....	FX-6	21	New Orleans, Mobile & Chicago Railroad.....	FX-6	13
Kinston & Snow Hill Railroad.....	⑩FX-6	12	New Orleans, Natalbany & Natchez Railway.....	FX-6	3
Knoxville, Sevierville & Eastern Ry. Co.....	⑩FX-6	56	New Orleans, Texas & Mexico Railroad.....	FX-6	7
			New York Central & Hudson River Railroad.....	FX-8	37
Lake Charles Ry. & Navigation Co.....	FX-6	7	New York, Chicago & St. Louis Railroad.....	FX-6	30
Lake Erie & Western Railroad.....	FX-6	34	New York, New Haven & Hartford Railroad.....	FX-6	17
Lake Shore & Michigan Southern Railway.....	FX-6	47	Niagara, St. Catharines & Toronto Railway.....	FX-6	11
Lancaster & Chester Railway.....	FX-6	9	Norfolk & Western Railway.....	FX-6	36
Lawndale Railway & Industrial Co.....	①FX-6	45	Norfolk Southern Railroad Co.....	FX-6	12
Lawrenceville Branch Railroad.....	②FX-6	56	North & South Carolina Railway.....	⑩FX-6	45
			Northampton & Hertford Railroad.....	⑩FX-6	45
			Northern Alabama Railway.....	⑩FX-6	56
			Northern Michigan Transportation Co.....	FX-6	11
			Northern Ohio Railway.....	FX-6	34
			North Louisiana & Gulf R. R.....	FX-6	8
			North Western Railroad of South Carolina.....	②FX-6	36

For abbreviations and reference marks, see page 7.

6. Changing traffic conditions, clerical errors, and other causes make it necessary to issue supplements to traffic publications, and the nature of them will be discussed later on. It is required that the number of supplements that may be in effect at one time shall be stated in the upper left-hand corner of the publication, as shown in Fig. 6. The statement of this number does not mean that there will necessarily be as many supplements as are indicated, but that not more than the specified number will be effective. It is often the case that there are fewer supplements than are allowed, or, there may be none.

8. A tariff, that is of sufficient size to make a table of contents desirable or necessary, is required to have such a table, of which Fig. 7 is an illustration. The use of the table of contents in a tariff of considerable size, will often save much time.

9. It is common for an agent or a carrier to act for several carriers in the issuing of tariffs. When tariffs are issued under such conditions, it is required that the agent or carrier issuing such tariffs shall do so under written authority filed with the Interstate Commerce Commission in the form of what is known as *concurrences*. It is further required that there shall appear in the front of the tariff a list of the concurrences given in favor of the carrier or agent who issues the tariff, as is illustrated by Fig. 8, which shows the names of the railroads participating in the tariff in which the list is printed.

There are different forms of concurrence, each designated by an identifying number, as is illustrated in Fig. 8, where it will be noted that in some cases Form 6 is specified and in other cases, Form 8. The prefix FX indicates that the concurrence is given in connection with freight tariffs; PX would indicate a concurrence given for passenger tariffs. Each road is required to number each form of concurrence in rotation and such number is given in the column headed No. Thus, the figure 3 opposite Franklin & Abbeville Railroad in Fig. 8 indicates that the third FX 6 which that road has filed with the Interstate Commerce Commission is in effect.

10. Where a tariff contains rates on a number of commodities, it is required that there shall be a complete index of



## INDEX

— OF —

Articles for which Commodity Rates are provided on pages 94 and 148 to 392, inclusive.

NOTE.—The following list enumerates only such articles as are given specific rates in this tariff; except as otherwise provided on page xxvi, articles not specified will take class rates.

ARTICLES	Item No.	ARTICLES	Item No.	ARTICLES	Item No.
<b>A</b>					
Absorbers, shock.....	1615	Attachments, switch stand, 2995, 3000, 4474, 4476.....	1630	Barrels, ash.....	3100
Accumulators, hydraulic.....	39 1408	Augers, post hole.....	3575	Barrels, chlorination.....	39, 4108
Acid, acetic.....	1 11, 5	Automobiles, passenger.....	1630, 1640	Barrels, fish.....	3755, 4538
Acid, picric.....	1 11, 5	Axes, car wheel, 2985, 2990, 2995, 3000, 4474, 4476, 4478.....	2995, 3000, 4474	Barrels, garbage.....	1000, 1905
Acid, stearic.....	4 16	Axes, locomotive.....	3595	Barrels, iron or steel.....	3755 15, 8
Acid, sulphuric.....	1630, 1640	Axes, vehicle, wooden.....	3595	Barrels, paper.....	3755 15, 8
Acids.....	1630, 1640	Axes, vehicle, iron or steel.....	1870, 3645	Barrels, refrigerator.....	3755 15, 8
Adhesives.....	3400, 3405, 3410	<b>B</b>			
Agricultural Implements, as described in, 300 to 365, incl., 4004 to 4012, incl., 4750, 4752, 4754.....	2 10	Backing, wood.....	2315, 4386, 4388	Barrels, steel.....	1610
Albums, paper.....	2275 28, 9	Backs, chair, wooden, 1350, 4150, 4152, 4154, 4180.....	2810, 2820	Barrows, baggage.....	3755 15, 8
Alcohol, denatured.....	2275 28, 9	Backs, sink, iron or steel.....	2810, 2820	Barrows, charging, iron.....	39 1408
Alcohol, solidified.....	2275 28, 9	Backs, urinal stall, iron or steel.....	2810	Bars, angle.....	2925, 4456
Alcohol, wood.....	480, 400, 17, 9	Backs, water closet stall, iron or steel.....	2810	Bars, angle, for refuse burner.....	30, 5
Ale.....	480, 400, 17, 9	Bagging, burlap.....	145	Bars, capstan.....	640, 31, 0
Alleys, bowling, automatic.....	1700	Bagging, clayed, cotton.....	1900 1, 5	Bars, cast-iron iron or steel, 1885, 2175, 4230, 4248, 4240, 4242, 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620.....	2175 4230, 12, 8, 4240, 4242, 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620
Alleys, box-ball, (see).....	375, 38, 28, 9	Bagging, cotton.....	145	Bars, fish.....	2925, 4456
Aluminum.....	375, 38, 28, 9	Bagging, for baling cotton.....	145	Bars, grate.....	3025, 4790
Aluminum, scrap.....	375, 38, 28, 9	Bagging, gunny.....	145	Bars, grate, for cooling room, 911, 4128.....	4128
Ammonia.....	375, 38, 28, 9	Bagging, hemp.....	145	Bars, iron or steel, 1885, 2175, 2995 12, 8, 4238, 4240, 4242, 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620.....	4238, 4240, 4242, 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620
Ammonia, anhydrous.....	375, 38, 28, 9	Bagging, jute.....	145	Bars, rail joint splice.....	2925, 4456
Ammonia, aqua.....	375, 38, 28, 9	Bags, burlap.....	145	Bars, roller, paper mill, 2355, 2365, 4400 to 4406, incl.....	2355, 2365, 4400 to 4406, incl.
Ammonia, nitrate of.....	375, 38, 28, 9	Bags, cotton.....	145	Bars, saw.....	3005
Ammonia, sulphate of.....	375, 38, 28, 9	Bags, cotton, paper line 1.....	145	Bars, stamping.....	1985
Ammunition, as described in 415, 420.....	1110, 4146	Bags, gunny.....	145	Bars, truss, iron or steel, 2175, 4340, to 4354, incl., 4374, 4376.....	2175, 4340, to 4354, incl., 4374, 4376
Anchors, ground.....	3170, 3175	Bags, hemp.....	145	Bars, twisted, 1885, 2175, 4236 to 4242, incl., 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620.....	1885, 2175, 4236 to 4242, incl., 4250 to 4256, incl., 4340 to 4356, incl., 4374, 4376, 4620
Anchors, iron.....	3170, 3175	Bags, jute.....	145	Bars, welder.....	2925
Androns.....	1700	Bags, osenaburg cement.....	145	Bars, post cap, 2175, 4340 to 4354, incl., 4374, 4376.....	2175, 4340 to 4354, incl., 4374, 4376
Angles, iron or steel, 1885, 2175, 4236, 4238, 4240, 4242, 4250, 4340, 4342, 4344, 4346 to 4354, incl., 4374, 4376, 4622.....	1645, 1870	Bags, paper.....	2645, 2650, 2655, 4442	Bases, street lamp, iron.....	1915
Anvils.....	1645, 1870	Balances, spring.....	1553	Basins, lavatory, china.....	2795
Anvils and Vises, combined.....	1645, 1865	Balconies, iron.....	1860	Basins, lavatory, earthenware.....	2795
Apparatus, self-propelling, fire fighting.....	3755	Balloons, toy.....	3505	Basins, lavatory, iron or steel.....	2815
Apparatus, steam and hot water heating.....	1705	Balls, billiard, composition.....	490	Basins, paper.....	2640
Apples, fresh.....	1215, 4604	Balls, bowling alley.....	550	Basins, pulpboard.....	2660
Appliances, electrical, as described in 1065 to 1110, incl., 4142, 4144, 4146.....	545	Balls, crushing, iron or steel, 1880, 4616.....	1880, 4616	Basins, woodpulp.....	2660
Aprons, cotton.....	545	Balls, grinding, iron or steel, 1880, 4234, 4616.....	1880, 4234, 4616	Baskets, coal.....	4790
Argols.....	145	Balls, iron or steel.....	4416	Baskets, stove.....	4790
Arms, cross, telegraph, telephone 4388.....	145	Balls, pool, composition.....	4416	Baskets, waste, fibre board, pulpboard or strawboard.....	2640
Articles, aluminum.....	375, 380, 385	Balls, shake, composition.....	4416	Baskets, wooden.....	3755 15, 8
Asbestos Material, as described in, 430, 4014.....	430, 4014	Balls, steel.....	4416	Batteries, dry.....	1065
As-h, soda.....	3220, 4508, 4510, 4512	Balsam, fir.....	1220	Batteries, electric storage.....	1065
Asphalt.....	430, 435, 4014	Bands, hose.....	1553	Batteries for starting devices.....	1065
Asphaltum.....	435	Bands, metal.....	430, 4014	Batteries, wet.....	1065
Asses.....	4702, 4706, 4708, 4740	Bands, pipe, iron or steel, 1890, 4346 to 4354, incl., 4366.....	1890, 4346 to 4354, incl., 4366	Batts, cotton.....	1045, 1050
Attachments, gas burner.....	4790, 4792	Bands, projectile.....	570	Beads, corner, iron or steel.....	1520
Attachments, gas heating.....	1705	Bands, shingle, iron or steel, 1895, 4244, 4246, 4248, 4346 to 4354, incl., 4372.....	1895, 4244, 4246, 4248, 4346 to 4354, incl., 4372	Beams, brake.....	2995, 3000, 4474, 4476
Attachments, motor, 4050, 4052, 4054.....	4050, 4052, 4054	Banks, toy, iron.....	3485, 3505	Beams, iron or steel, 2175, 4340 to 4354, incl., 4374, 4376, 4622.....	2175, 4340 to 4354, incl., 4374, 4376, 4622
Attachments, percolating.....	580	Banks, toy, iron.....	3490, 3505	Beams, plow, wooden.....	3595
		Bar, brass, bronze or copper.....	570	Beams, scale.....	3145
		Bark, medicinal.....	965	Beams and Pork, canned, 11, 620 625, 4040 to 4048, incl., 4758.....	11, 620 625, 4040 to 4048, incl., 4758
		Barley.....	760, 765, 1060 30, 5	Beams, cocoa.....	885, 890
		Barley, pearl.....	725, 730, 4014, 4076	Beams, dried.....	1225, 4548

vi

FIG. 9

# INDEX TO STATIONS FROM AND TO WHICH RATES APPLY—Cont.

Index No.	Stations	Item Nos.	Index No.	Stations	Item Nos.
	S—Cont.				
248	Sayre.....Mont.	235.	275	Toledo.....Mont.	235, 335.
330	Scott.....Wash.	155, 235.	165	Touhey.....Wash.	155, 235.
9	Scott.....Wash.	155, 235.	60	Trask.....Mont.	235.
96	Seville.....Mont.	235.	25	Trinidad.....Wash.	155, 235.
103	Seward.....Wash.	155, 235.	241	Troy.....Mont.	235.
223	Shelby.....Mont.	235, 305, 335.	35	Tunis.....Mont.	235.
337	Shorey.....Mont.	245.		Tweed.....Mont.	235.
179	Sidney.....Mont.	245.		Ty.....Wash.	155, 235.
	Silica (B. A. & P. Ry.).....Mont.	185, 220, 230, 235, 245, 265, 350.		'U	
144	Silver.....Mont.	235.	134	Ulm.....Mont.	235.
174	Silver Bow (B. A. & P. Ry.).....Mont.	185, 220, 230, 235, 245, 265, 350.	34	Ural.....Mont.	235.
101	Simla.....Mont.	235.		V	
125	Simons.....Mont.	235.		Valley.....Wash.	150.
87	Skykumish.....Wash.	155, 235.	296	Vandalia.....Mont.	235.
114	Skyland.....Wash.	235.	122	Vaughn.....Mont.	235.
332	Sloan.....Mont.	235.	216	Velbar.....Mont.	235.
72	Snowden.....Mont.	235.	251	Verona.....Mont.	235.
	Soap Lake.....Wash.	155.	102	Virden.....Mont.	235.
	Somers.....Mont.	150, 210, 215, 235, 255, 267, 285, 300, 335.	249	Virgelle.....Mont.	235.
54	Sparwood.....B. C.		65	Vista.....Mont.	235.
102	Spion Kop.....Mont.		33	Volcours.....Mont.	235.
1	Spokane.....Wash.	135, 140, 145, 150, 155, 160, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 260, 265, 267, 275, 280, 295, 300, 305, 310, 315, 320, 325, 330, 335, 340, 345, 350, 355, 360, 365, 370, 375, 380.		Vulcan.....Wash.	155.
	Springdale.....Wash.	150.		W	
310	Sprole.....Mont.	235.	287	Wagner.....Mont.	235.
196	Stanford.....Mont.	235.	45	Waldo.....B. C.	250.
	Startup.....Wash.	155, 235.	214	Wallum.....Mont.	235.
178	Staton (B. A. & P. Ry.).....Mont.	185, 220, 230, 235, 245, 265, 350.	32	Warland.....Mont.	235.
185	Stillwater.....Wash.	155, 235.		Waukon.....Wash.	155, 235.
38	Stockett.....Mont.	235, 335.	187	Wayne.....Mont.	235.
290	Stonehill.....Mont.	235.	233	Wellwood Spur.....Mont.	235.
	Strater.....Mont.	235.		Wenatchee.....Wash.	155, 235, 240, 340.
61	Stratford.....Wash.	155, 235.	300	Whately.....Mont.	235.
181	Stryker.....Mont.	235.	66	Whitefish.....Mont.	150, 215, 235, 240, 255, 267, 285, 300.
	Stuart (B. A. & P. Ry.).....Mont.	235, 305.	155	Wickes.....Mont.	235.
88	Sultan.....Wash.	155, 235.	163	Wilder.....Mont.	235.
123	Summit.....Mont.	235.		Wilson Creek.....Wash.	155, 235.
	Sun River.....Mont.	235.	197	Winchester.....Wash.	155, 235.
105	Supplee.....Wash.	155, 235.	302	Windham.....Mont.	245.
186	Sweet Grass.....Mont.	215, 305, 335.		Wiot.....Mont.	245.
50	Swift.....Mont.	235.	140	Withrow.....Wash.	155, 235.
	Swinton.....B. C.	170, 175, 250.	306	Wolf Creek.....Mont.	245.
297	Tampico.....Mont.	235.		Wolf Point.....Mont.	245.
245	Teton.....Mont.	245.		Woodruff.....Wash.	155.
261	Tiber.....Mont.	245.	166	Woodville.....Mont.	235.
58	Tobacco.....Mont.	235.	15	Wreccoe.....Idaho	
	T			X	
297	Tampico.....Mont.	235.	269	Xenia.....Mont.	235.
245	Teton.....Mont.	245.		Y	
261	Tiber.....Mont.	245.	24	Yakt.....Mont.	235, 335.
58	Tobacco.....Mont.	235.	31	Yarnell.....Mont.	235.
	T			Z	
297	Tampico.....Mont.	235.	279	Zunch.....Mont.	235.

FIG. 10

the commodities that are included in the tariff, as is illustrated in Fig. 9, which is a page from such an index. The item numbers refer to the item in the tariff where rates for the commodity mentioned are given. If the tariff includes only one, or a very few commodities, they may be specifically enumerated on the title page.

The list of points from and to which a tariff applies is a very important feature of a tariff unless the number of points is so few that they can be listed on the title page. There are many ways of furnishing this information, and Fig. 10 shows one method of providing such a list. It should be understood that, for use in a tariff such as that from which Fig. 10 is taken, the points or stations mentioned in the tariff and to or from which freight is shipped are numbered. In Fig. 10 the names of the points are arranged alphabetically and the numbers are given in the column headed Index No. In the section of the tariff called the Geographical Index (not shown here), the points are listed in the order of their numbers.

The item numbers given to the right of the names in Fig. 10 refer to commodities for which rates to or from those points are quoted in the tariff. By this system of indexes and numbers any information given in the tariff can be referred to readily.

**11.** Many tariffs carry rules to govern certain situations that arise in connection with the handling of traffic under the provisions of the tariff. These rules necessarily vary widely, but those in Fig. 11 may be taken as fairly typical.

In tariffs, special treatment and exceptions to general provisions are provided for by means of notes. These notes are not issued in any uniform style, but they should not be overlooked. Fig. 12 shows notes from a tariff of several hundred pages, and it will be seen that they are of such a nature that serious errors in handling shipments would result if they were ignored.

**12.** In the use of tariffs, all the features that have been described must be taken into account. Another thing to be borne in mind in connection with tariffs, is that the Interstate Commerce Commission is very insistent that all tariffs shall be

Rule No.	Tariff 7-B	RULES AND REGULATIONS—Concluded.	
22	Shipper's Count:	When freight is loaded by shipper, and at "Shipper's Count," the carriers will not be responsible, directly or indirectly, for damage resulting from the improper stowage or insufficient packages, or for any discrepancy in count.	
		Governed, except as shown below, as to prepay requirements at stations, changes in station names, establishment and abandonment of stations and sidings, and handling of carload and less-than-carload freight at stations and sidings:	
		On Lines of:	By Publications Shown Below, Supplements Thereto and Reissues Thereof.
		Atchison, Topock & Santa Fe Railway.	Circular No. 2181-C, I. C. C. No. 7828, C. R. C. No. 389.
		Bullfrog Goldfield Railroad.	Official List of Open and Prepay Stations No. 22, I. C. C. No. 1286, of F. A. Leland, Agent.
		Cement, Tolenas & Tidewater Railroad.	
		Los Angeles & Salt Lake Railroad.	
		McCloud River Railroad.	
		Nevada-California-Oregon Railway.	
		Nevada Copper Belt Railroad.	
	Station Changes and Prepay Requirements:	Oakland, Antioch & Eastern Railway.	Official Station List G. F. D. No. 5-K (I. C. C. No. 32).
		Pacific Electric Railway.	Official list of Open and Prepay Stations No. 22, I. C. C. No. 1286, of F. A. Leland, Agent.
		Santa Maria Valley Railroad.	
		Sierra Railway Company of California.	
		Southern Pacific Railroad.	{ G. F. D. Circular No. 263-C (I. C. C. No. 3793), C. R. C. No. 2066, for list of stations to which freight must be prepaid. G. F. D. Circular No. 238-D (I. C. C. No. 4105).
		Sunset Railway.	{ Circular No. 1-F, I. C. C. No. 14, C. R. C. No. 14, of F. W. Gomph, Agent.
		Tonopah & Tidewater Railroad.	Official list of Open and Prepay Stations, No. 22, I. C. C. No. 1286, of F. A. Leland, Agent.
		Virginia & Truckee Railway.	
		Western Pacific Railroad.	Circular No. 39-B, I. C. C. No. 114, C. R. C. No. 110.
24	Stopping to Load or Unload in Transit:	Carload rates apply only to full carload shipments, from one consignor at initial point of shipment, consigned and to be delivered to one consignee at one destination. (Unless otherwise specifically provided immediately in connection with individual rate items, carload shipments cannot be stopped in transit to partly unload or to complete loading at the rates named herein. All carload shipments so stopped will be subject to the rate to and from the point at which the stop is made.	
25	Terminal, and Other Charges, Privileges and Allowances:	Except as otherwise specifically provided herein, shipments made at rates named herein are subject to the terminal and other charges, privileges and allowances provided by tariffs of individual lines, parties to this tariff, and lawfully on file with the Interstate Commerce Commission and State Railroad Commissions.	
26	Transportation of Fruit and Vegetables:	All charges must be prepaid or guaranteed by a good and sufficient bond. Freight charges on carload shipments of Fresh Fruit or Vegetables will be computed on basis of weight obtained at original point of shipment or first station having track scales which shipment passes through to destination, subject to published minimum carload weight, except that Fresh Fruit and Fresh Vegetables for which estimated weights may be provided will be charged for on basis thereof.	
30	Transportation of Live Stock:	Live Stock will be transported on lines of carriers participating in rates named herein in accordance with the regular publications of each carrier providing Rules and Regulations Governing Transportation of Live Stock lawfully on file with the Interstate Commerce Commission and State Railroad Commissions. For Rules governing transportation of parties in charge of Live Stock see following circulars, supplements thereto and reissues thereof: A. T. & S. F. Ry. Circular No. 2192-C (I. C. C. No. 7437, C. R. C. No. 354). Bullfrog Goldfield Railroad. { L. A. & S. L. R. R. Circular S. L. R. No. 106-B (I. C. C. No. 440, C. R. C. No. 200). Los Angeles & Salt Lake Railroad. { Southern Pacific Railroad. { Circular G. F. D. No. 188-E (I. C. C. No. 3454, C. R. C. No. 1214). Tonopah & Goldfield Railroad. { Circular No. 114-A (I. C. C. No. 53). Tonopah & Tidewater R. R. { Pacific Freight Tariff Bureau Circular No. 2-C (I. C. C. No. 295, C. R. C. No. 158 of F. W. Gomph, Agent). Western Pacific Railroad. { Circular No. 40-I, I. C. C. No. 160, C. R. C. No. 184.	

FIG. 11

## EXPLANATION OF NOTES—Continued.

**NOTE 93.**—Baltimore, Md., rates plus arbitraries shown below will apply from points subject to this note, except that the arbitraries on Lumber, carloads, will be in addition to the rate applying from Romney, W. Va.

FROM	RATES IN CENTS PER 100 POUNDS (except as noted)									PEACHES		Lumber, Carloads In cents per 2000 pounds
	CLASSES								Carloads, minimum weight, 100 pounds, Subject to Rule 27 of the Official Classification	Less Carloads		
	1	2	3	4	5	6	Rule 25	Rule 26				
Cunningham..... W. Va.	15	12	9	7	5	4	10	7	20.5	21.0	40	
Durgon..... "	20	16	12	9	6	5	13½	9½	12.6	26.3	40	
Glebe..... "	10	8	6	5	4	3	7	5	8.4	15.8	40	
Johnson (Hampshire Co.)..... "	10	8	6	5	4	3	7	5	6.3	10.5	40	
McNeil..... "	15	12	9	7	5	4	10	7	9.5	21.0	40	
Moorefield..... "	15	12	9	7	5	4	10	7	10.5	21.0	40	
Pancake..... "	10	8	6	5	4	3	7	5	6.3	10.5	40	
Petersburg..... "	20	16	12	9	6	5	13½	9½	13.7	26.3	40	

**NOTE 94.**—Baltimore, Md., rates plus the following arbitraries:

1	2	3	4	5	6	RULE 25	RULE 26
5	4	3	2	2	2	3	2

will apply from West Romney, W. Va., except that Baltimore rates without the addition of such arbitraries will apply as follows:

On Apples, in barrels, boxes or crates, any quantity, and in bulk, carloads; Bark, Extract, carloads and less carloads; Bark, Ground, carloads; Canned Fruit and Vegetables, any quantity; Fleshings, Glue Stock, Hair and Leather, carloads and less carloads; Peaches, any quantity.

**NOTE 95.**—To make through rates from Austen Mine No. 2, Dixie Mine, Gorman Mine No. 2 and Vulcan Mine, W. Va., add \$3.00 per car to the rates from Newburg, W. Va.

**NOTE 96.**—To make through rates from Sunny Side Mine, W. Va., add \$3.00 per car to the rates from Hardman, W. Va.

**NOTE 97.**—To make through rates from points bearing this note, add the following arbitraries to the rates from Salisbury Junction, Pa.:

1	2	3	4	5	6	RULE 25	RULE 26
5	4	3	2	2	2	3	2

Rates in Cents per 100 pounds.

**NOTE 98.**—To make through rates from points bearing this note, add the following arbitraries to the rates from Garrett, Pa.:

1	2	3	4	5	6	RULE 25	RULE 26
5	4	3	2	2	2	3	2

Rates in cents per 100 pounds.

**NOTE 99.**—Apply New York rates, except that in no case shall rates be less than:

1	2	3	4	5	6	RULE 25	RULE 26
83½	73	55	37½	31½	26	62	44

Rates do not include Marine Insurance while property is on board steamers of the Potomac & Chesapeake Steamboat Company.

**NOTE 100.**—Through rates from stations on Bachman Valley R. R. will be made by the addition of the following arbitraries to the rates shown herein from Black Rock, Pa.:

Tracey..... Md.	Melrose..... "	Ebbvale..... "	RULE 25 RULE 26 CLASSES.							
			1	2	3	4	5	6	25	26
			6	6	5	5	4	3	5	5

5 Cents per 100 pounds.

(325)

FIG. 12

so constructed as to leave no doubt as to their meaning; therefore, that body holds that a tariff is to be interpreted by what it *says* and not by what *someone may think it was intended to say*. The fact that the man who issued a tariff intended to make a certain provision has no bearing on the situation, if what he put in the tariff can reasonably be interpreted to mean something else. The Commission also insists that technical or territorial terms used must be definitely defined. For example, if the term *packing-house products* is used, it must be defined either in the publication where it is used or in some other publication to which specific reference is made. The same thing applies to the use of territorial terms. Thus, if the term *Southeastern Territory* is used in a tariff, that territory must be definitely defined, as in Fig. 13, or reference must be made to a publication where such a definition can be found.

**13.** Reference has been made to the fact that it is necessary to issue supplements to traffic publications. Supplements contain such information as it is necessary to publish, they carry the same I. C. C. number as the publication which they affect, and they are numbered in numerical order. Thus, the first supplement to a tariff is Supplement No. 1, the second is No. 2, etc. Each supplement must carry specific information as to what supplements are in effect. Thus, Supplement No. 5 may specify that Supplements Nos. 3 and 5 are in effect and carry all changes. Fig. 14 is a portion of a supplement.

A careful examination of supplements is always necessary, as they often carry important information. For example, increases in rates often appear in supplements, and if such increases are not taken into account all the profits from a sale may be wiped out by the higher freight rates. There is an unfortunate tendency among users of tariffs to overlook the importance of supplements.

# SOUTHEASTERN TERRITORY—Concluded

(SEE MAP)

## MONTGOMERY SUB-TERRITORY

Comprising stations in

ALABAMA,

FLORIDA,

GEORGIA,

MISSISSIPPI,

as follows :

ALABAMA.—All stations EXCEPT those shown on pages 21 and 26 and the following points on the N. C. & St. L. Ry.:

Wass.	Card.	Coalton.	Harvest.	Mitchell's Spur.	Plevna.
Bell Factory.	Chase.	Deposit.	Lax.	New Market.	Ready.
Bobo.	Clark.	Elkwood.	Mercury.	Normal.	Toney.

FLORIDA.—Stations as follows:

Alford.	Caryville.	Fountain.	Lakewood.	Noma.	Sneads.
Argyle.	Century.	Galliver.	Laurel Hill.	Olive.	Southport.
Aycock.	Chattahoochee River.	Galt City.	McDavid.	Panama City.	Steele City.
Barrineau Park.	Chipley.	Gonzalez.	Macon.	Paxton.	Sven.
Barth.	Compass Lake.	Gothic.	Majette.	Pensacola.	Sweetwater.
Bear Head.	Cottage Hill.	Goulding.	Marianna.	Pine Barren.	Vicksburg.
Betta.	Cottontale.	Graceville.	Mill Bayou.	Ponce de Leon.	Washington.
Bluff Springs.	Crestview.	Grand Ridge.	Milligan.	Pringle.	Wausau.
Bohemia.	Cypress.	Greenhead.	Millville Jct.	Quinette.	Welchton.
Bonifay.	Deerland.	Gull Point.	Milton.	River Junction.	West Pensacola.
Brent.	De Funiak Springs.	Harold.	Molino.	River Side.	Westville.
Buckeye.	Eleanor.	Harp.	Mossy Head.	Roberts.	Wynnum.
Campbellton.	Excambia.	Holts.	Mulsa.	Round Lake.	Ynlestra.
Campton.	Esto.	Jacobs.	Muscogee.	Saunders.	Youngtown.
Cantonment.	Everett.	Lake Merial.	Nixon.		

GEORGIA.—Stations as follows:

Columbus.	Fort Gaines.
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MISSISSIPPI.—Stations as follows:

Aberdeen Jct.	Burnsville.	Gatman.	Tuka.	New Hope.	Steens.
Acker.	Burnt Cut.	Glens.	Junction City.	Paden.	Strickland.
Amory.	Cauhorn.	Golden.	Kewaunee.	Pine Ridge.	Theadville.
Arket.	Chancellor.	Gravel Siding.	Leedy.	Plantersville.	Tiahomingo.
Becker.	Coke.	Greenwood Springs.	Log Spur.	Quincy.	Tommuba.
Belmont.	Crandall.	Holcut.	McCrory.	Russell.	Walker.
Bigbee.	Davis.	Houston's Mill.	Neil.	Shiloh.	Wilcox.
Black Creek.	Dennis.	Indian Mound.	Nettleton.	Smith's Spur.	Wise's Gap.
Brewer.					



## SECTION 3—EAST BOUND—Continued.

## COMMODITY RATES—Continued.

Forest Products, viz.: Wood, fuel, including Cord Wood, as described in Item 25, page 28 of Tariff, carloads, minimum weight, as follows: Cars 34 feet and under in length.....11 cords Cars over 34 feet in length and under 36 feet in length.....14 cords Cars 36 feet and over in length.....18 cords										Route via		
Item No.	Rate in Cents per Cord.											
	FROM	TO	Blair Jct. .... Nev.	Millers..... Nev.	Tonopah..... Nev.	Goldfield..... Nev.						
			Soft Wood	Hard Wood	Soft Wood	Hard Wood	Soft Wood	Hard Wood				
1810-B Cancels 1810-A	Applies on Interstate Traffic only.									S. P. Co., via Mina, Nev.		
	Truckee.....Crd	656½	727	695½	765½	703	765½	734½	797			
	Elba....."	625	687½	664½	727	703	765½	734½	797			
	Elba....."	625	687½	664½	727	703	765½	734½	797			
	Calvada Cal-Nev Line	625	687½	664½	727	703	765½	734½	797			
	Marmol.....Nev.	625	687½	664½	727	703	765½	734½	797			
	Verdi....."	625	687½	664½	727	703	765½	734½	797			
	Lawton....."	609½	672	649	711½	687½	750	703	765½			
	Reno....."	609½	672	649	711½	687½	750	703	765½			
	Westwood....."	625	687½	664½	727	703	765½	734½	797			
	Applies on Intrastate Traffic within Nevada only.											
	Calvada Cal-Nev Line	500	550	531½	581½	562½	612½	587½	637½			
	Marmol.....Nev.	500	550	531½	581½	562½	612½	587½	637½			
	Verdi....."	500	550	531½	581½	562½	612½	587½	637½			
	Lawton....."	487½	537½	519	569	550	600	562½	612½			
	Reno....."	487½	537½	519	569	550	600	562½	612½			
Reissue:—Effective (Intrastate) February 19, 1920, in Supplement No. 2 to P. S. C. N. No. 76. Reissue:—Effective (Interstate) August 26, 1920, in Supplement No. 13 to I. C. C. No. 427												
Item No.	Effective Date	In Sup.	ARTICLES In Carloads		FROM (See page 10 to 23 incl. of Tariff for points in Groups referred to below.)		TO		Rate in Cents per 100 Lbs.	Route via		
* 3365-A Cancels 3365	Feb. 19, 1920	2	Item No. 3365, page 100 of Tariff, used in error; rate transferred to Item No. 3665 hereof.									
* 3665	Feb. 19, 1920	2	Machinery, old, second-hand, Pipe, iron, corrugated, old, second-hand, Pipe, iron, old, second-hand. Minimum weight 60,000 lbs. Expired September 30, 1920.		①	Dayton.....Nev.	①	Tonopah.....Nev.	\$	S. P. R. R., Mina, Nev.		
+ 3820-A Cancels 3820	Oct. 23, 1920 Sup. 15 to I. C. C. 427 Sup. 15 to P. S. C. N. 76		Meat, fresh, straight carloads.....		①	Reno.....Nev.	①	Blair Jct. .... Nev.	130	S. P. Co., via Mina, Nev.		
			Poultry, dressed, straight carloads.....					Millers ..... "	140½			
			Poultry, dressed, straight carloads.....					Tonopah..... "	140½			
			Poultry, dressed, straight carloads.....					Goldfield..... "	140½			
			Meat, fresh, mixed carloads.....					Blair Jct. .... Nev.	112½			
			Poultry, dressed, mixed carloads.....					Millers ..... "	112½			
			Poultry, dressed, mixed carloads.....					Tonopah..... "	112½			
			Poultry, dressed, mixed carloads.....					Goldfield..... "	112½			
			Poultry, dressed, mixed carloads.....					Blair Jct. .... Nev.	112½			
			Poultry, dressed, mixed carloads.....					Millers ..... "	112½			
*Reissue. ①Applies from intermediate points, as per Item 16, page 27 of Tariff. ②Applies to intermediate points, as per Item 17, page 27 of Tariff.												
②Applies from points named only.												

### OBTAINING TARIFFS

**14. Who Issues Tariffs.**—Tariffs are issued either by individual lines or by agents acting for two or more lines. The agency method of issuing tariffs is very prevalent in connection with traffic that can be handled by two or more lines. For example, tariffs covering traffic between the eastern part of the United States and the Pacific Coast are issued by the Transcontinental Freight Tariff Bureau in Chicago. The issuing of tariffs by agents has two distinct advantages: (1) It saves money, as one issue will carry information that would otherwise have to be carried in a number of publications. (2) It is convenient, as it puts into one issue information that might otherwise be found only by going through many publications.

**15. How Tariffs Are Identified.**—The matter of definitely identifying tariffs when making reference to them or when applying for them is very important. The four prevalent methods of designating tariffs are as follows:

1. By the I. C. C. number. Thus, if it is desired to show the authority for assessing a certain rate, reference might be made to *Tariff I. C. C. 100 of the A. B. C. Railroad*. This is always the proper method to be used in correspondence of any kind with the Interstate Commerce Commission.

2. By the use of what are known as serial numbers. This method may be used when the publisher of the tariff has designated it by a number and letter in addition to the I. C. C. number. Thus, Tariff I. C. C. 500 may also be designated as Tariff 1A. When the tariff is reissued, it may be I. C. C. 700, but the serial designation will be changed only to the extent that Tariff 1A becomes Tariff 1B. That is, only the letter designation is changed with each reissue, the number remaining the same. This method of designating indicates the order in which the different tariffs in a series were issued and is easy to remember.

3. The use of carriers' numbers other than series numbers. Under this plan, the carrier issuing the tariff uses a number in the nature of a file number on the tariff, in addition to the

I. C. C. number. In some cases this file number may be accompanied by a prefix, such as G.F.D. or G.F.O.

4. By naming a tariff according to the nature of its contents, as in the case of the Tropical Fruits Tariff, or the Athens Tariff.

**16. Securing Tariffs.**—Tariffs are usually furnished without charge to bona-fide shippers and receivers of freight. In some cases charges are made for all tariffs furnished, but in some cases they are furnished without charge to those who need them in the making of shipments, but a charge is made for them when they are wanted only for general reference purposes.

To obtain tariffs, it is necessary to apply to the proper source and to specify what tariff is wanted, two things not always easy to determine.

**17.** In cases where it is known what tariffs are needed, a letter on the letterhead of a shipper or receiver of freight, addressed to the traffic department of the transportation company or to the issuing agent, will generally produce the desired result, except when, as is not unfrequently the case, the supply is exhausted. Some agents are authorized to distribute tariffs only on the request of a road that belongs to the bureau for which the agents act. In such cases, usually it is not difficult to get some member road to approve the request, particularly if the road gets or may get a part of the traffic which is affected by the tariff wanted.

**18.** When the I. C. C. number or other designation of the tariff needed is not known, the request must be made as specific as possible. For example, if a shipper is handling only one commodity, as lumber, for example, between certain points, he should specify this commodity in his request. If, however, a considerable number of commodities, moving between a number of points are involved, the request will have to be more general in its nature. In any event, information should be given as to the general classes of articles, and typical sections of the country and individual points involved. Thus, a whole-

sale grocer might specify in his request such commodities as a house in that line would naturally ship, and indicate Points A, B, and C as typical points to which he ships. With such specific information available, the carriers will generally be glad to attend to details as far as is possible.

Unlikely as it may seem, it is a fact that individual lines and tariff-issuing agents often receive letters requesting "copies of all your tariffs." To appreciate just how indefinite and impossible of compliance such a request is, it is only necessary to stop to think of the number of tariffs issued by such roads as the New York Central or the Santa Fe railroads. Such a request will generally go to the waste basket, since it indicates such an ignorance of the subject as hardly to warrant even a reply.

**19.** The finding of what tariffs are needed is often a matter of considerable difficulty, as there are several hundred thousand tariffs in effect in this country at all times, and there is no one place where all these tariffs are on file.

A certain amount of knowledge and ingenuity is always required in dealing with tariff matters, and, when used in connection with such qualities, the following three plans will be effective in finding what tariffs are needed. The information required may be obtained:

1. By asking the carriers to state the tariff authority for charges assessed on bills rendered. For example, if a freight bill is received from the railroad and the charges cannot be checked from the tariffs available, request should be made for the I. C. C. numbers or other identifying marks of the tariffs on which the charges are based. If possible, copies of the tariff thus referred to should be secured.

2. By the use of tariff indexes. Every carrier under the jurisdiction of the Interstate Commerce Commission is required to file an index of the tariffs which the carrier issues or is party to. A study of such index will often give much valuable information, as the tariffs are described with sufficient completeness to enable the user to identify any publication in which he is likely to be interested. Tariff-issuing agents do

not issue such indexes, but their publications are listed in the indexes of the individual lines that are parties to the tariffs.

3. Requests for information relative to tariffs may be made in general terms with as many details as may be necessary, as has been suggested in the preceding Article.

**20.** It is very desirable that shippers and receivers of freight should have as complete files of tariffs as are necessary for the proper conduct of their business, but it is not possible to secure these in a few days. Very often it is found that a certain tariff is needed, only to learn that the carrier or agent who issues it cannot furnish a copy, because the supply is exhausted.

When making requests for tariffs, the person applying for them should ask that his name be put on the mailing list for supplements and reissues, as it is only in that way that up-to-date information can be kept on file. However, tariff files should not be loaded up with tariffs for which the owner has no use. Whenever it is found that publications are being received and not used, the carrier or agent should be notified to stop sending them, so as to avoid unnecessary expense to the carrier, and also the expenditure of time and money in filing such issues.

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## ROUTING FREIGHT SHIPMENTS

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### FACTORS TO BE CONSIDERED IN ROUTING

**21.** In most cases where property is to be moved between two points there is a choice of routes over which the shipment shall move. Therefore, the one having charge of the shipping should have sufficient definite knowledge of how the property is to be moved to judge which route may be the best, all things being considered. There was a time when it was thought that the shipper might properly leave the routing to the transportation companies; and in many cases, if the shipper gave instructions they were nothing more than the information which an interested representative of a railroad had given to him, and which generally served to give the representative's line, and those with whom it worked, the haul, regardless of the best

interests of the shipper and the consignee. It should be understood that the routing of freight is not a matter to be worked out by mathematical formulas but, rather, is a matter of knowledge and judgment.

**22.** There are two basic factors that must be considered in choosing routes and carriers: (1) the rates applicable; (2) the service furnished. While there are many cases where one or the other of these factors may properly govern entirely, there are other cases where both should be taken into consideration. The purchase of transportation, which generally includes some option in the routes used, is not unlike the purchase of merchandise, in that the purchase of an article because it is low in price does not necessarily mean real economy if the article does not serve the purpose; nor is the purchase of an expensive article justified when a cheaper one will serve the purpose as well or better.

How different conditions may justify the choice of different routes between the same points is illustrated by two carloads of freight to be moved between New York and Chicago under varying conditions, as hereafter described.

In the first case it is assumed that the consignee is in urgent need of the shipment, regardless of the cost of transportation, and that he has a private sidetrack from the New York Central into his place of business in Chicago. Under such conditions, the shipper would surely use the more expensive but quicker all-rail route, regardless of cheaper routes available. The governing factors in a case like this would be: (1) The direct delivery to the consignee's place of business in the original car, as against a probable truck haul if the shipment arrived on the water front in Chicago; (2) the securing of the fastest time for delivery, as the shipment is badly needed; (3) the avoiding of loss of time and possible damage to the shipment at Buffalo, as the rail-and-lake shipment would have to be transferred from the car to the ship at Buffalo, for movement by way of the lakes to Chicago.

In the second case, let it be assumed that a carload shipped from New York is to be delivered in a warehouse near the water



front in Chicago, and that the shipment is not needed by any specified date. Under such conditions, a shipper would show good judgment in most cases by utilizing the cheaper rail-and-lake route; for the quicker service, carrying with it higher rates, would not represent any advantage for which additional costs should be incurred.

**23.** As previously stated, service is one of the important factors in routing. Service may be considered from two viewpoints: (1) The time consumed in moving the goods between specified points; (2) the number of times it is necessary to transfer property from one vehicle to another on the way. The number of transfers will have a bearing on the time, as it is to be expected that time will be lost in making them.

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### TRANSFERS

**24. Avoidance of Transfers.**—Even though the transferring is done in the least possible amount of time, there is still the very important fact that the transfer of property from one vehicle to another is never beneficial to the property, and often is very injurious. The problem of routing, from the standpoint of transfers, reduces itself to utilizing routes requiring the fewest transfers, and on which the transfers are least likely to work injury to the property.

The avoidance of transfers makes a strong appeal to experienced shippers, and that is one of the reasons why motor trucks have come into favor as competitors with railroads on short-haul traffic. For example, in making a shipment by rail from New York to Philadelphia, it usually is necessary to load a shipment on a truck, take it to the freight house, unload it on the freight-house floor, and finally load it into the railroad car. At Philadelphia these operations will have to be performed in reverse order before the shipment is in the hands of the consignee. In contrast to this series of transfers, it may be possible to load a truck at the shipper's place of business in New York and not have to touch the goods again until that same truck is backed up to the receiving department of the consignee in Philadelphia.



As carload freight, moving by rail, is subject to transfer only in emergencies, such as the break-down of a car en route, the matter of transfers is largely one affecting less-than-carload freight.

**25.** On some routes, through package cars are run, in which less-than-carload freight may be shipped without transfers at the junctions of the different railroads over which it passes; and where these through cars are available, they present a practical way to avoid loss of time and damage to property by transfers. The possibility of making use of such cars should be considered, not only for shipping from the point of origin but from points in transit. For example, a merchant shipping from New York may not be able to secure a through package car from the point of origin to destination; but he may be able to utilize such a car from New York to Chicago and another one from Chicago to destination. This procedure may mean a saving of two or more transfers en route.

**26. Classes of Transfers.**—The simplest, and what should be the most expeditious transfer, is where freight is transferred directly from one vehicle to another, as between two cars on the opposite sides of a platform. Such transfer places often furnish an assembling point for freight from different stations in a large city, as in the case of certain New Jersey Terminals of roads serving New York City. To these places freight delivered to the local stations of the road in Greater New York is brought and distributed into cars for numerous points. One feature of this assembling is that through cars can be made up at such a place when no one of the stations from which the freight comes would have enough freight to make up such cars. At transfer points such as these, the transferring is done without delay so that the cars go forward in trains that operate on regular schedules. Thus, it is a common practice for a considerable part of the freight loaded at various stations during the day to be on its way to destination by the next morning or sooner.

**27.** The next class of transfers is where the carrier bringing in the freight and the one that is to take it out are at distance

from each other, so that a vehicle has to be used for movement between the incoming and outgoing cars. In many cases the vehicle used is a truck, and its use may necessitate four handlings: (1) From the incoming car to the freight-house floor; (2) from the freight-house floor to the truck; (3) from the truck to the freight-house floor of the roads over which the freight is to go out; (4) from the freight-house floor to the outgoing car. In this class of transfer the opportunities for delay are many. Sometimes this kind of transferring is done by private truckmen, who, under contract with the railroad, haul the freight through the streets of the city. In such case the property is actually out of possession of the carrier part of the time. Wherever possible, transfers of this kind are made in railroad cars operating between the two roads. When cars are used, generally it is only necessary to handle the freight twice in making the transfer; that is, into the car used for the transfer and out of that car into the outgoing car. Where a vehicle must be used between the incoming and outgoing cars, the time when the freight reaches the outgoing car is an important factor. That is, if the outgoing car moves every day, it is essential that the transfer freight reach it sufficiently early in the day to be loaded or it will have to wait 24 hours or longer, for the next car. For example, if the outgoing car is closed at three o'clock in the afternoon and the transfer freight reaches the car at 11 o'clock each morning, it will go forward that day; but if it reaches there at 4 o'clock in the afternoon it will not go forward until the next day.

**28.** At points where water transportation supplements rail transportation, transfer is often made by use of lighters built either with or without their own motive power and having a capacity generally of several carloads. Because of the large capacity of lighters and the expense of moving them, there may be a delay while a load is being accumulated sufficient to justify their movement.

Where transfers must be made by lighters or by water transportation of any kind, it is important, in choosing a route, to take into account the fact that the goods will be more or less

exposed to dampness and to rough handling. Even though the property may not actually be exposed to the weather or touched by water, there is a certain amount of dampness in the air which may have a bad effect on some goods, and on salt water the dampness is made more active by salt. This factor of dampness must often be provided against by the use of oiled paper, metal lining or other protection against the elements, particularly in making shipments to foreign countries.

Freight is loaded into cars through side doors, and in comparatively small quantities, but often such is not the case with boat shipments; for though much freight is loaded through side openings on boats, a great deal is loaded through top openings.

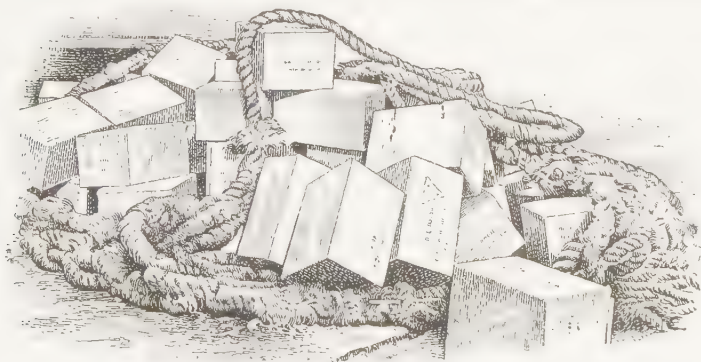


FIG. 15

This method necessitates the lifting of the freight from the docks to a sufficient height to clear the decks of the boat. In many cases this lifting is done in rope slings, one type of which is shown in Fig. 15. The procedure in loading by this sling is as follows: (1) The sling lies flat on the dock while the goods to be loaded are piled on it; (2) when the sling is ready to lift, the corners of the sling are pulled together like the corners of a sheet, throwing all the contents in a heap in the middle of the sling; (3) when the sling is lifted to the necessary height it is dropped into the hold of the boat, often with considerable speed; (4) the corners of the sling are released so that the contents which have been in a heap fall apart as illustrated in Fig. 15.

The shipper to points served only by boats must make the best of such conditions of moisture and rough handling, but when choosing between a rail route and a water route, or a rail-and-water route, such conditions may have great weight.

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#### TEMPERATURE AND CLIMATE

**29.** Temperature and climatic conditions may have a bearing on the routing of traffic, particularly in the case of perishable or semi-perishable commodities. For example, on traffic moving from the eastern part of the United States to many western points, there is often a choice between routing the traffic through Canada or over routes farther south. On traffic moving in the summer months there may be little choice, but in January or February, where there may be heavy snows on the northern routes with much less probability of their being encountered on southern routes, it would be good judgment to use southern routes. Again, when commodities affected by heat are to be shipped, it is often wise to use the routes where it is natural to expect the lowest temperature, other things being equal. As some commodities may be shipped without refrigeration when low temperatures are prevalent, but require ice when the temperature is high, it may sometimes be possible to save the cost of refrigeration by using a route where the temperature is not likely to go above a certain point.

What has been said as to climate and temperature applies not only to domestic but to foreign traffic; and the climatic differences may be several times as great in foreign traffic as in domestic traffic, because in handling traffic in this country the differences are those of only a few hundred miles at the most, while in foreign traffic they may amount to thousands of miles.

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#### THE APPORTIONMENT OF TRAFFIC

**30.** In routing of shipments, it should be borne in mind that no one line can furnish the best service to all points. Regardless of the merits of any line for traffic in general, or for traffic to certain points, there will be some points to which

one line can give better service than can other lines; and once this fact is established, the traffic should be given to that line.

Shippers sometimes try to keep the representatives of all lines happy by giving each a share of the business merely as a matter of good fellowship, but while this may show a spirit of fairness and cooperation, it will probably not prove beneficial in the long run. For example, if a shipper is dividing his package-car business to a certain point among three lines, one or both of two results is apt to follow: (1) One or more of the lines may not get enough freight to justify the continuance of the service; (2) the lack of sufficient tonnage to justify the continued operation may result in the withdrawal of the car operated by the line giving the best service.

In many cases, the best interests of all concerned will be served by giving each line what it can best handle, which will mean that though a line loses business for one point it will probably gain business for some other point to which it can give better service.

From what has been said it should not be understood that the division of traffic between different lines is never justified. It is true that there are many points to which more than one line can give good service, and in such cases it is not only proper, but oftentimes advisable, to see that provision is made for dividing the traffic among lines that have demonstrated their ability to deliver the goods. There are so many uncertainties attached to the handling of traffic that it is always well to have the good will of every one possible. For example, almost every shipper has some traffic that he wants expedited from time to time, although such handling of it does not represent any profit to the transportation line. If, however, it happens that the line that can help him in this emergency is one to which he has been giving no business, then he is in a poor position to ask a favor. On the other hand, if he has been giving the line in question a fair amount of profitable tonnage, his chances are excellent for getting what he wants. Some of the largest and most efficient shippers have reduced the prorating of tonnage to a definite basis by the use of books or cards that specifically provide for such divisions of business.

## MAP ROUTING

**31.** A method of routing that looks very practical, but is far from effective, is what is known as *map routing*, which is the term applied to the routing of freight on information gained from the study of maps. It is generally the case that the use of maps for routing is for the purpose of finding the most direct route between two points, but such a consideration ignores the two principal factors in routing, that is, the rates applicable and the service furnished. To put the matter in another way, the study of maps may show the shortest routes between two points, but it will not necessarily show the shortest workable routes, and a workable route is the one that is wanted. The following are some of the reasons why information derived from maps alone cannot be depended on in routing freight:

1. Not only do the railroads have designated points for the interchange of traffic with each other, but with different parts of their own lines. The designation of certain routes might easily provide for the use of junction points where there are no facilities for the interchange of traffic.

2. In some instances the roads might be of different gauges, with the result that cars of one road would be too wide or too narrow to run over the tracks of the other road.

3. Where both water lines and rail lines are included in the route, there might be no facilities for the interchange of traffic, which is very often the case. Further than this, it might be the case that the boat line would not accept the traffic on account of its nature, as there are many commodities moved by rail which cannot move by water.

4. Last, but by no means least, there may be no through rates applicable over the designated route; in which case the charges might be three or four times as high as over routes where through rates are available. In many cases traffic will not be accepted for transportation over routes for which there are no through rates.

**32.** From what has been said it should not be understood that the use of maps, distance tables, and similar information



is not advisable, but rather that they should not be used without knowledge and consideration of other, and often more important factors. For example, the finding of the shortest route between two points may be the starting point in determining the best route, if the test of rates and service is applied to it. It may then develop that though the shortest route is not a workable one, only slight modifications of it are necessary to produce a desirable route. \_\_\_\_\_

#### FEWEST LINES FOR BEST SERVICE

**33.** In general, it will be found that, even where the rates are the same over different routes, the one requiring the use of the fewest lines will offer the best service. In many cases the use of the fewest lines may be forced by the provisions of the tariffs governing. Regardless of tariff limitations, however, it is to be expected that if one road can handle a shipment for a thousand miles, it can give better service than if three roads were to handle it for the same distance. This statement is not to be considered as a rule without exceptions, but, rather, a general rule to which many exceptions will be found.

For example, there are many cases where the use of a single line would involve a very roundabout haul, while the use of one or more other lines would give a direct haul between the points of origin and destination. In cases where the use of the initial line would involve a very roundabout haul, it is not to be expected that that line would insist upon a haul for the entire distance, simply because it eventually reaches the desired destination. A natural result of the desire of carriers to hold the longest possible haul for themselves, is that often the haul in one direction will be principally over one line, with a very short haul for another line, while in the opposite direction, the haul will be entirely over the lines of the carrier having the short haul in the first-mentioned case.

In connection with the matter of length of haul, attention is called to Section 15, Paragraph 4 of the Interstate Commerce Act, which provides that a carrier may not be required to "short haul" itself; that is, to haul traffic for short distance



when it could haul it for a much longer distance. The paragraph is as follows:

(4) In establishing any such through route the Commission shall not (except as provided in section 3, and except where one of the carriers is a water line) require any carrier by railroad, without its consent, to embrace in such route substantially less than the entire length of its railroad and of any intermediate railroad operated in conjunction and under a common management or control therewith, which lies between the termini of such proposed through route, unless such inclusion of lines would make the through route unreasonably long as compared with another practicable through route which could otherwise be established: *Provided*, That in time of shortage of equipment, congestion of traffic, or other emergency declared by the Commission, it may (either upon complaint or upon its own initiative without complaint, at once, if it so orders without answer or other formal pleading by the interested carrier or carriers, and with or without notice, hearing, or the making or filing of a report, according as the Commission may determine) establish temporarily such through routes as in its opinion are necessary or desirable in the public interest.

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### THE LEGAL SIDE OF ROUTING

**34.** In the preceding pages, the matter of routing has been considered almost entirely with reference to the making of an intelligent choice of routes on the basis of location or service offered by the different lines. In addition to these factors, however, it is necessary to take into account certain legal matters, such as the provisions of the Interstate Commerce Act and the rulings of the Interstate Commerce Commission.

**35. Right of Shipper to Designate Routing.**—One of the first matters that comes up for consideration in connection with routing, is as to the right of the shipper to designate the route over which a shipment shall move when there is a through rate between two points. (Where two or more rates are added together the shipper has a right to designate the routes over which the lowest combinations will apply, if there are interchange facilities via routes thus designated.)

Section 15, Paragraph 8, of the Interstate Commerce Act, which deals with the right of the shipper to designate routes, is as follows:

(8) In all cases where at the time of delivery of property to any railroad corporation being a common carrier, for transportation subject to the provisions of this Act to any point of destination, between which and the point of such delivery for shipment two or more through routes and through rates shall have been established as in this Act provided to which through routes and through rates such carrier is a party, the person, firm, or corporation making such shipment, subject to such reasonable exceptions and regulations as the Interstate Commerce Commission shall from time to time prescribe, shall have the right to designate in writing by which of such through routes such property shall be transported to destination, and it shall thereupon be the duty of the initial carrier to route said property and issue a through bill of lading therefor as so directed, and to transport said property over its own line or lines and deliver the same to a connecting line or lines according to such through route, and it shall be the duty of each of said connecting carriers to receive said property and transport it over the said line or lines and deliver the same to the next succeeding carrier or consignee according to the routing instructions in said bill of lading: *Provided, however,* That the shipper shall in all instances have the right to determine, where competing lines of railroad constitute portions of a through line or route, over which of said competing lines so constituting a portion of said through line or route his freight shall be transported.

**36.** To a considerable extent, it is optional with the carriers to specify the route over which a shipment shall move, but, if they do not specifically provide such a limitation in their tariffs, the traffic may be routed over the lines of any of the carriers party to the rates applicable on the shipment. Fig. 16 is an example of a provision in a tariff limiting the routing of shipments.

As an example of a case where the carrier might take exception to routing designated by the shipper, let it be supposed that the bill of lading specifies that a shipment is to be handled via Point B, while the regular junction point on such traffic is Point A. The reason assigned for the objection by the carrier to the use of Point B, is that there are no arrangements for the division of rates via that point. The Interstate Commerce Commission has taken care of a situation of this kind in Rule 4 (j) of Tariff Circular 18-A, which is as follows:

(j) The different routes via which tariff applies may be shown, together with appropriate reference to application of rates. When a tariff specifies routing, the rates may not be applied via routes not specified.

**Item No. 2300.**

Traffic subject to the rates shown herein will be transported between all points except where otherwise stated (taking same rates as New Orleans, Port Chalmette, Baton Rouge, Fla. and Mobile Ala. and differentials higher (pages 13 to 24 inclusive) on the one hand and all points (except where otherwise stated) taking same rates as New Orleans, Port Chalmette, Baton Rouge, Fla. and Mobile Ala. on the other, via the routes indicated inclusive).

The routes shown herein are the routes ordinarily and customarily used and should be strictly observed; but if for convenience of, or through error of carriers parties to this tariff, shipments are sent via other junction points, but over lines of carriers shown herein as participating via some junction point, the rates shown herein will apply.

Exception No. 1.—The rates, on petroleum and its products, from points on the Louisiana Surtliff R. Y. will not apply in connection with the Fort Worth & Denver City R. Y. or the New Orleans & Northeastern R. R.

Exception No. 2.—Rates on traffic originating at points on the N. O. T. & M. R. R. will not apply via Eunice, La., in connection with the C. R. I. & P. R. Y.

Exception No. 3.—The rates named herein to Pensacola, Fla., via the L. & N. E. R. R. when in connection with the Mo. Pac. R. R. will only apply when shipment is route. A via East St. Louis, Ill.

**ROUTING**

(As shown on pages 76 to 93, inclusive.)

**ROUTING INSTRUCTIONS.**

Points Taking New Orleans Rates or Differentials Higher Located on this	Sections	VIA Intermediate Lines and Junctions	And either of the lines shown below.					
			Page 92	Page 92	Page 93	Page 93	Page 93	Page 93
Alabama & Vicksburg R. Y.	A	See Vicksburg, Shreveport & Pacific R. Y. page 91.						
Alexandria & Western R. Y.	A	Alexandria, La. C. R. I. & P. R. Y. L. R. & N. Co. L. & A. R. Y. Mo. Pac. R. R. or T. & P. R. Y. and connections.						
Arkansas & Louisiana Midland R. Y.	A	Crossett, Ark. ....		C. R. I. & P.				
Chicago, Rock Island & Pacific R. Y.	A	Through Line via Little Rock, Ark., and El Reno, Okla. ....		C. R. I. & P.				
	B	Tecla, Okla., C. R. I. & G., Amarillo, Tex. ....			P. W. & D. C.			
Franklin & Abbeville R. Y.	A	Adeline, La., N. I. & N. R. R. Port Barre, La., N. O. T. & M. R. Y. and connections						
Gulf, Florida & Alabama R. Y.	A	Kimbrough, Ala., Sou. R. Y. and connections.						
	A	Jackson, Miss., Ill. Cent., and its connections.						
	B	Hattiesburg, Miss., N. O. & N. E., and its connections.						
Gulf & Ship Island R. R.	C	Hattiesburg, Miss., G. M. & N., and its connections.						
	D	Jackson, Miss., Y. & M. V., Memphis, Tenn., N. C. & St. L., Paducah, Ky. ....		C. B. & Q.				
	E	Hattiesburg, Miss., M. & O., Jackson, Tenn., N. C. & St. L., Paducah, Ky. ....		C. B. & Q.				

A tariff may show the routing ordinarily and customarily to be used and may provide that, if from any cause shipments are sent via other junction points, but over the lines of carriers parties to the tariff, the rates will apply.

If a tariff contains no routing directions the joint rates, shown therein, are applicable between the points specified via the lines of any and all carriers that are parties to the tariff; and shipper must not be required to pay higher charges than those stated in the tariff, because the carriers have not agreed divisions of the rates via the junction through which the shipment moves. If agent of carrier bills or sends shipments via a route or junction point that is covered by the tariff, but via which no division of the rate applies, it is for the carriers to agree between themselves upon the division of the rate, and the intermediate or delivering carriers may demand from the carrier, whose agent so missends shipment, their full local rates for the services which they perform. (This must not be construed as conflicting with routing and misrouting rulings published in Conference Rulings Bulletins.)

A phase of routing of considerable importance is the question of the liability of the carrier to pay damages growing out of misrouting by carriers when the shipper has failed to designate routing. This subject is dealt with in Conference Ruling 214 (c) quoted in Art. **37**.

**37.** The matter of routing and misrouting has been dealt with at great length by the Interstate Commerce Commission, and the following quotations from the Conference Rulings of the Commission refer to many of the commonly met phases of the matter. In attempting to apply these rulings to individual cases it must be borne in mind that many of the rulings depend upon certain specified conditions, and that such rulings will not apply unless the circumstances in the case in question are practically the same.

EXCERPTS FROM CONFERENCE RULINGS OF THE INTERSTATE  
COMMERCE COMMISSION

91. **A Much Longer and More Indirect Route Not a Reasonable Route.** (June 29, 1908.)—A shipment was tendered destined to a certain point, the direct route to which was over the lines of two carriers, a distance of 358 miles, the rate via that route being 22 cents. It was possible to send the shipment around over the lines of three carriers, a distance of 617 miles, and secure a combination rate of only 19 cents. Application for refund was made on account of the difference between

the rates: Held, That the claim for refund should be denied on the ground that the much longer and indirect route is not a reasonable route. (See ruling 214; also *R. B. Homer Lumber Co. v. S. A. L. Ry.*, U. R. Op. A-351.)

98. **Local Billing to Avoid Higher Through Rate.** (October 12, 1908.)—A lawful through rate existed between two points, applicable over two routes, one of which was indirect and, therefore, not ordinarily used by the carrier for through movements. The shipper billed locally to a point on the latter route, and rebilled to destination without taking either constructive or actual possession of the shipment at the local point, but making his rebilling arrangements with the agent of the carrier at a distant point. Upon arrival of the shipment at destination, the carrier collected the balance of the through rate: Held, That the local billing was not in good faith, but was a device between the shipper and the carrier's agents to avoid the higher through rate, by having the carrier's agents act as the forwarding agents of the shipper; therefore, the through rate is the only rate lawfully applicable. Affirmed in ruling 337. (See also ruling 24 and 365; also *In re Wharfage Facilities at Pensacola, Fla.*, 27 I. C. C., 258; *Doran & Co. v. N. C. & St. L. Ry.*, 33 I. C. C., 527; and *Kanotex Refining Co. v. A., T. & S. F. Ry.*, 34 I. C. C., 271.)

137. **Initial Carrier Liable for Misrouting.** (Feb. 2, 1909.)—An initial carrier delivered a shipment to a connection, but did not give it any routing instructions beyond noting on the waybill the through rate via the cheaper of two available routes. The connecting carrier sent it over the route yielding it the greater revenue, but carrying the higher through rate: Held, That the initial carrier is liable for the misrouting. (Construed and amended by the ruling 286c. See ruling 199.)

190. **In the Absence of Instructions, Initial Carrier Not Required to Route Via Rail and Water.** (June 14, 1909.)—Rule 70 of Tariff Circular No. 15-A (*Conference Ruling 214*) contemplates that where rail-and-water and all-rail rates are available for a shipment, the shipper shall designate which class of routing he desires and that the agent of the carrier shall secure such designation from the shipper.

A shipment was delivered to a rail carrier destined to a point to which it might be forwarded via either all-rail or rail-lake-and-rail route. No class of route was designated by the shipper. Shipment was forwarded all rail: Held, That taking into consideration the liabilities of carriers and the question of marine insurance upon water-borne traffic, the carrier's agent did not negligently misroute this shipment. (Interpreted in ruling 316. See *Kecton v. St. L. S. W. Ry. Co. of Texas*, 39 I. C. C., 221.)

199. **Responsibility for Misrouting.** (June 22, 1909.)—When a shipper has given routing instructions which a carrier fails to transmit to its connection, the carrier so failing shall be responsible for all additional

transportation charges resulting from a misrouting of the shipment. (Amended by ruling 286c. See ruling 137.)

**214. Routing and Misrouting Freight.** (March 18, 1907.)—(a) Alleged neglects or errors on part of agents of carriers in misrouting shipments lead to numerous claims of overcharge, many of which are meritorious. The lawful charge on any shipment is the tariff rate via the route over which the shipment moves. No carrier can lawfully refund any part of the lawful charge except under authority so to do from the Commission or from a court of competent jurisdiction. (See ruling 286a.) That thorough understanding and uniform practice may be had in this connection, the Commission issues the following administrative ruling:

(b) In order to secure desired delivery to industries, plants, or warehouses and avoid unnecessary terminal or switching charges, the shipper may direct as to terminal routing or delivery of shipments which are to go beyond the lines of the initial carrier; and his instructions as to such terminal delivery must be observed in routing and billing such shipments. The carriers may not disregard the instructions of shippers as to intermediate routing, except when tariff of initial line reserves the right to carrier to dictate intermediate routing. When such reservation is made in tariff (1) where all-rail rates and rail-and-water rates are available, the agent of carrier must have the shipper designate which of the two he wishes to use; and (2) the agent must not route shipment via a route that will be more expensive to the shipper than the one desired by him, or that does not furnish substantially as good and expeditious service. If carrier is not willing to observe the intermediate routing instructions of shipper, it must not execute bill of lading containing such routing. Carriers will be held responsible for routing shown in bill of lading. (See rulings 190, 284, and 316. Amended by ruling 321.)

(c) In the absence of specific through routing by shipper, which carrier is willing to observe, it is the duty of the agent of the carrier to route shipment via the cheapest reasonable route known to him of the class designated by the shipper—that is, all-rail, or rail-and-water—and via which he has rates which he can lawfully use. If a foreign car is available, which under rules as to car service must be sent via a particular line or route over which a higher rate obtains, agent must explain to shipper that fact and allow shipper to elect whether he will use that car at the higher rate or wait for another car. If shipper elects to use the car at the higher rate, agent should so note on bill of lading. If agent is in doubt, he should secure information from proper officers of traffic department. It is important that agents at initial points be able to, and that they do, quote correct rates and give correct routings. (See rulings, 91, 140, 190, 284, 316; also *United Kansas Portland Cement Co. v. M. P. Ry. Co.*, U. R. Op. A-321; *Lord & Bushnell Co. v. M. C. R. R. Co.*, 22 I. C. C., 463; *Meeds Lumber Co. v. A. & V. Ry.*, 38



I. C. C., 679; *Donahue-Stratton Co. v. C., M. & St. P. Ry. Co.*, 38 I. C. C., 739; and *Chattanooga Implement & Mfg. Co. v. L. & N. R. R. Co.*, 40 I. C. C., 146.)

(d) If a carrier's agent misroutes a shipment and thus causes extra expense to the shipper over and above the lawful charges via another available route of the class designated by shipper—that is, all-rail, or rail-and-water—over which such agent had applicable rates which he could lawfully use, and responsibility for agent's error is admitted by the carrier, such carrier may, as to shipments moving subsequent to March 18, 1907, adjust the overcharge, so caused by refunding to shipper the difference between the lawful charges via the route over which shipment moves and what would have been the lawful charges on same shipment, at the same time, via the cheaper available route of the class designated, which could have been lawfully used. Such refund must in no case exceed the actual difference between the lawful charges via the different routes as specified, and must in every instance be paid in full by the carrier whose agent caused such over-charge and must not be shared in by, or divided with, any other carrier, corporation, firm or person. This authority is limited strictly to the cases specified and to the circumstances recited and does not extend or apply to instances in which soliciting or commercial agents of carriers induce shippers to route shipments over a particular line via which a higher rate obtains than is effective via some other line. (See rulings 93 and 286; also *Duluth & Iron Range R. R. Co. v. C., St. P., M. & O. Ry. Co.*, 18 I. C. C. 485.)

(e) The rule is intended to apply to cases in which the agents, who bill or actually forward or divert shipments through error or oversight, send the shipments via routes that are more expensive than those directed by the shippers or available in the absence of routing instructions by shippers. It must not be used in any case, or in any way, to "meet" or "protect" a rate via another route or gateway via which the adjusting carrier has not in its tariffs at the time the shipment moves rates which are available and lawfully applicable thereto, nor as a means or device by which to evade tariff rates or to meet the rate of a competing line or route, nor to relieve shipper from responsibility for his own routing instructions.

(f) (Nov. 15, 1907.)—The prerequisites to any refund under this rule, are admission by carrier of responsibility for its agent's error in misrouting the shipment, and such carrier's willingness to bear the extra expense so caused, without recourse upon any other carrier for any part thereof. If, therefore, the error is discovered before the shipment has been delivered to consignee, or before charges demanded upon same have been paid, the carrier acknowledging responsibility for the error may authorize the delivering carrier to deliver shipment upon payment of the charges that would have applied but for the misrouting and to bill upon it for the extra charge; or, if the shipment has been delivered



undercharged before the error is discovered, the carrier that acknowledges responsibility for the error may pay the undercharge to the carrier that delivered the shipment instead of requiring it to collect the undercharge from shipper, to be refunded to shipper. (Interpreted by ruling 198.)

Complete distinction must be observed between cases to which this rule applies and those provided for under ruling 217.

(g) Shippers must bear in mind that there is a limit beyond which an agent of a carrier could not reasonably be expected to know, as to terminal delivery or local rates at distant points and on lines of distant roads to or with which he has no specific joint through rates. Consignors and consignees should cooperate with agents of carriers in avoiding misunderstandings and errors in routing and must expect to bear some responsibility in connection therewith. (See *What Cheer Tool Co. v. K. & M. Ry. Co.*, U. R. Op. 2159, and *Isbell & Co. v. L. S. & M. S. Ry. Co.*, 19 I. C. C., 450.)

(h) (March 9, 1909.)—If, under this rule, a carrier adjusts a claim for misrouting and later learns that the responsibility for misrouting actually rests upon another carrier, such other carrier may voluntarily reimburse the carrier that made the payment in the full amount of such payment, or the matter may, if necessary, be referred to the Commission for determination of the question of which carrier is responsible for the error.

**230. Transit Privilege—Responsibility of Carrier for Misrouting.** (Nov. 22, 1909.)—As the agent of an intermediate carrier has no means of knowing just why a shipment has been routed through particular junctions, he has no right to substitute his own judgment as to routing for the specific routing instructions accompanying the shipment. In a stated case, the initial carrier issued bills of lading showing particular routing but no rate; the transfer billing subsequently issued to a connecting line showed the routing and a 10-cent division of a 33-cent rate that did not apply through the junctions named, but through another junction; and the agent of the connection, therefore, diverted the shipment through the latter junction to destination. It subsequently appeared that because of the diversion the shipper had lost a transit right at a given point on the route specified, which was necessary to effect the sale of the shipment at destination; Held, That as tariffs are permitted to contain rules providing that they are subject to the transit privileges shown in the tariffs of individual carriers on file with the Commission, the intermediate line was responsible to the shipper for the difference between the rate paid in order to get the shipment back to the transit point and the legal rate over the route directed by the shipper. (See ruling 214.)

**243. Routing Instructions With and Without Naming the Rate.** (Dec. 6, 1909.)—A shipment was routed through a certain junction by

the consignor, but on the paper presented to the Commission it did not clearly appear whether he also named the rate that had been available through that junction but was canceled shortly before the movement. The instructions were complied with by the carrier and the new and higher rates applied: Held, That this was a shipper's error and the higher rate must be collected unless he also named in the bill of lading the lower rate legally in effect through another junction, in which case carrier was liable. (See ruling 474.)

**286. Adjustment of Claims for Damages Resulting From the Misrouting of Freight.** (May 10, 1910.)—(a) The Commission holds that it has exclusive jurisdiction over claims for damages arising from the misrouting of freight. (See rulings 139 and 214.)

(b) The statute of limitations embodied in section 16 of the act to regulate commerce, as amended, governs misrouting claims, and, therefore, the Commission is without jurisdiction to take cognizance of claims presented more than two years after the delivery of shipments at destination. (See ruling 139; also *Phillips v. Grand Trunk Ry.*, 236 U. S., 662.)

(c) If a connecting line accepts a shipment at the junction point without routing instructions, it will be held responsible for any excessive charges that may directly accrue from its error in forwarding the shipment to destination via any other than the cheapest available route. (Amending rulings 137 and 199. See *Duluth & Iron Range R. R. Co. v. C. St. P. M. & O. Ry. Co.*, 18 I. C. C., 485; and *American Lumber & Export Co. v. A., T. & N. R. R. Co.*, 42 I. C. C., 260.)

(d) (Restated in ruling 509.)

(e) The Commission will exercise jurisdiction to award damages as against the carrier guilty of misrouting to the extent of the additional cost thus imposed on the delivering carrier.

(f) (Amended and restated in ruling 474c.)

**316. Conference Ruling 284 Superseded.** (May 1, 1911.)—Upon inquiry as to the application of *Conference Ruling 190* and *214* to routes made up partly of a car ferry: Held, That routes involving the transshipment of freight from a rail line to a water line, or from a water line to a rail line, are "rail-and-water routes," and that routes composed of rail lines connected by car ferries, over which the freight is ferried in the car, constitute "car-ferry routes" and are understood to be included in the general term "all-rail." (See *Hollingshead & Blei v. P. & L. E. R. R. Co.*, 18 I. C. C., 193.)

Held further, That where a shipper does not specify a particular route or a rail-and-water route, the carrier's agent must consider car-ferry routes as available in performing the duty of routing a shipment over the cheapest route. (See ruling 190, interpreting ruling 214.)

**321. Shipper May Direct Terminal Routing.** (June 2, 1911.)—In view of the amendment to section 15 of the act, paragraph *b* of *Conference Ruling No. 214* is now amended so as to read as follows:

(*b*) In order to secure desired delivery to industries, plants, or warehouses and avoid unnecessary terminal or switching charges, the shipper may direct as to terminal routing or delivery of shipments which are to go beyond the lines of the initial carriers; and his instructions as to such terminal delivery must be observed in routing and billing such shipments. When shipments are accepted without specific routing instructions from shipper, where all-rail rates and rail-and-water rates are available, the carrier's agent must have the shipper designate which of the two he wishes to use. Carriers will be held responsible for routing shown in bill of lading. (See rulings 190 and 316.)

**370. Misrouting Involving Loss of Transit Privilege.** (Oct. 8, 1912.) Besides stating the route and giving instructions to stop the car in transit to finish loading, a shipper also noted a through rate on the bill of lading. This rate did not apply over the indicated route, but was applicable over a route that did not permit the stop specified: Held, That the initial carrier, not having advised the shipper of the facts, is liable under *Conference Ruling 286f* for the higher charges that resulted from following the routing instructions. (See 474 amending 286f; also *Jefferson Lumber Co. v. M. & O. R. R. Co.*, 40 I. C. C., 44.)

**383. Misrouting Shipment.** (Nov. 11, 1912.)—The address of the consignee having been omitted, a shipment arriving at destination by a line other than that designated in the routing instructions was sent to a storage warehouse. The consignee had made inquiry for it of the delivering carrier noted on the bill of lading. The freight rates were the same by either route: Held, That the initial carrier is liable for the storage and drayage charges resulting from misrouting the shipment.

**474. Adjustment of Claims for Damages Resulting From Misrouting.** (May 25, 1915.)—*Conference Rulings 286d* and *286f* are amended to read as follows:

(*a*) It is the duty of a carrier to make delivery in accordance with routing directions. Where such routing instructions have not been followed and delivery is tendered at another terminal than that designated, it remains the duty of the delivering carrier to make delivery at the terminal designated in routing instructions, either by a switch movement or by carting. In either event the additional expense involved in making such delivery must be borne entirely by the carrier responsible for the misrouting, and the reimbursement thereof to the delivering carrier may be made by the carrier at fault without a specific order of the Commission. (See ruling 214*d*.)

(*b*) Restated in ruling 509.

(*c*) The obligation lawfully rests upon the carrier's agent to refrain from executing a bill of lading which contains provisions that can not

lawfully be compiled with, or provisions which are contradictory and, therefore, impossible of execution. When, therefore, the rate and the route are both given by the shipper in the shipping instructions and the rate given does not apply via the route designated, it is the duty of the carrier's agent to ascertain from the shipper whether the rate or route given in the shipping instructions shall be followed. The carrier will be held responsible for any damages which may result from the failure of its agent to follow this course.

If, however, the agent of the carrier, after exercising reasonable diligence, is unable to obtain more definite instructions as to routing, the goods should be sent via the route specified in the bill of lading. (Cancels rulings 159, 186, 192, 214i, and 231; see rulings 243, 370, and 397. See *Gibson Fruit Co. v. C. & N. W. Ry. Co.*, 21 I. C. C., 645; *Ludowici-Celadon Co. v. M. P. Ry. Co.*, 22 I. C. C., 589; *American Agricultural Chemical Co. v. B. & A. R. R. Co.*, 28 I. C. C., 400; *Goldfield Cases*, 34 I. C. C., 378; *Texarkana Pipe Works v. B., S. L. & Wn. Ry.*, 38 I. C. C., 341; *Chapin & Co., v. C. I. & L. Ry. Co.*, 38 I. C. C., 613; *Jefferson Lumber Co. v. N. & O. R. R. Co.*, 40 I. C. C., 44; *Laclede-Christy Clay Products Co. v. M. P. Ry. Co.*, U. R. Op. A-780; and *B. McCracken & Son v. B. & O. R. R. Co.*, U. R. Op. 2199.)

**509. Drayage Expense Resulting From Erroneous Terminal Delivery.** (June 19, 1917.)—*Conference Ruling 474b* amended and 392 rescinded.—In case the consignee elects to accept the shipment at the terminal where delivery has been erroneously offered rather than insist upon delivery at the terminal designated, the shipper or the consignee is entitled to recover damages in the sum of the difference between the expense of drayage actually incurred at a reasonable charge therefor and the expense which would have been incurred if proper delivery had been effected by the carrier. The carrier responsible for misrouting the shipment, resulting in a claim of this character, may reimburse the shipper or consignee entitled to reimbursement wholly at its expense without a specific order of the Commission in each case. In pursuing this course, carriers must accept full responsibility for the correct application of the rule and must make reports to the Commission in accordance with its order of July 3, 1917.

**38.** The method of determining the most advantageous routing may be summarized as follows: First, see what rates are applicable over different routes; then see what services go with these routes. It is then possible to determine which route gives the most for the money, everything considered.

In determining any legal questions that may be involved, great care should be exercised to make proper application of the law and the rulings.

# TRACER

Our No. ....  
In replying, please refer to above number

Carrier's No. ....

.....  
(Name of Agent.)

.....  
(Name of Carrier.)

.....  
Address

City

Dear Sir:—

The shipment described below has not been delivered. Please trace and effect delivery as quickly as possible, advising us date and to whom delivered. This tracer will serve as a formal notice of our intention to file claim in the event of your not being able to establish delivery of the shipment described herein.

## DESCRIPTION OF THE SHIPMENT.

Consigned to.....

Destination.....

Post-Office Address.....

Shipped from..... Date.....

Route..... Car Initial..... Car No.....

Marks..... (Larges..... Perpaid or Collect ).....

No. Packages	ARTICLES	Weight

Remarks:.....

Kindly acknowledge receipt of the above tracer, giving your tracer number, and oblige,

Yours truly,

Per.....

FIG. 17

## TRACING

**39. Definition.**—When a shipment fails to reach its destination within a reasonable time after it has been shipped, it is proper to ask the transportation company to find the missing property and see that it gets to its destination without delay. Such following up of a shipment is called *tracing* and the starting of such action is spoken of as *starting a tracer*.

**40. Methods of Tracing.**—According to different conditions, tracers may be started by any of the following methods:

1. Telephone or personal requests may be utilized as a means of getting action started without delay, but when these methods are used they should be confirmed by some form of written request to the carrier to take the desired action.

2. Forms of the nature of the one shown in Fig. 17 may be used. It should be noted that this form has incorporated in it notice to the effect that the tracer will serve as notice of an intention to file a claim if the property is not delivered. Forms may be adjusted to meet situations of different kinds.

3. Personal letters are often most effective in tracing.

4. Telegrams serve the same purpose in connection with tracing that they do with other matters; that is, they are used when other methods are not rapid enough. Telegrams or letters both carry the idea of a special action, rather than a routine action as is the case where forms are used. It is known to the employes of the carriers that many industrial concerns start tracers on all shipments where they have not been notified that delivery has been effected. Therefore, to the carrier's clerks a tracer on a form often means only that some clerk is performing a purely mechanical function in asking that the shipments be traced. On the other hand, a letter or a telegram carries with it the idea that something has come up which has led to action in the individual case, and that there is really need that something be done.

5. Another method of tracing, but one that is very expensive and can be justified only under unusual conditions, is to send a man to personally find the car for the shipper, rather than to depend on the carriers to locate it and expedite its movement. During the World War and the congestion that followed it, many concerns had men who would travel along the same route as the car and see that it was not sidetracked. Their work in this connection often involved searching freight yards, interviewing yardmasters, trainmasters, and other employes, in an effort to keep the cars going. This method may be used whenever the importance of prompt delivery warrants it or when congested conditions make it necessary. Sometimes, instead of having a man make the entire journey with the car, he is sent out only after the car is reported as being delayed.

**41.** Whatever may be the method used in tracing, it is essential that complete information be given the carrier as to the shipment which it is desired to have traced. Fig. 17 shows the essential points of information required, to which may be added such things as the waybill number, the bill-of-lading number, and any other information that will aid in the identification. A copy of the bill of lading will often furnish the quickest method of aiding the carriers to locate the shipment.

**42. Where to Start a Tracer.**—A tracer for a less-than-carload shipment should be started with the carrier at the point of origin, as the means of identifying such shipments on the records is the waybill number rather than the description of the shipment. For example, if a shipment is handled by two carriers, the carrier that receives it from the originating carrier will have to have the number of the waybill from the originating carrier in order to locate the record of the receipt and forwarding of the shipment. A mere request to trace 10 cases shipped from John Jones to Bill Smith will not mean much to the second carrier without the details from the originating carrier, such as that the 10 cases were delivered to the second carrier on waybill No. 1008, dated July 2, in car X Y Z 100. In some cases shippers secure the waybill references, which include all information shown on the waybill which will be of



importance in tracing, and other information from the originating carrier, and forward this to the connecting carriers, instead of depending on the originating carrier to do it. Shippers who use this method, do so because they think they can get better service than if the matter is left to those who have a large number of tracers to get out for many shippers.

For tracing carload shipments, the car number furnishes a definite identification mark, and, therefore, the shipper is in a good position to trace shipments with connecting carriers as well as with the originating carrier. It is common for shippers to get reports from junction points where a car has passed, or should have passed, on the way to destination, and thus learn the date of delivery or find where the car may have been delayed. Some railroads have established a service by which agents at important junction points send out *passing records*; that is, records of the cars that passed their point during a certain period of time. This provides tracing information which shippers can obtain without making a special request for it.

**43. When to Trace.**—One of the first things necessary for getting results in tracing shipments is to appreciate the fact that the purpose of a tracer is to locate freight that is missing or delayed, and not to expedite freight that is moving along as it should. It is a good general rule that a tracer should not be started until a reasonable amount of time had elapsed for the delivery to have been effected.

Some shippers have made a practice of starting a tracer on the same day the bill of lading is receipted, thinking thus to cause the shipment to move faster. That the tracer will not serve such purpose is shown by the fact that the carriers do not forward such tracers. Other shippers have asked for tracers in order to obtain proof with which to confront customers who do not pay their bills.

Because of the large number of such unnecessary tracers, the carriers have come to look on tracers with suspicion, and some carriers require that a request for a tracer be accompanied by a statement that the shipment has not been delivered at a specified date.

# FREIGHT CLAIMS

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## PRINCIPLES AND METHODS OF HANDLING CLAIMS

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### GENERAL CONSIDERATION OF CLAIMS

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#### IMPORTANCE OF CLAIMS

**1. Extent of Losses.**—One of the most important features of traffic work is the handling of claims for overcharge, loss or damage in connection with freight shipments. It is possible to get some idea of the importance of claims from the fact that in the year 1920 the loss and damage to freight amounted to over \$100,000,000, one-half of which some competent authorities estimate should never have occurred. This amount, large as it is, does not fully represent the loss incurred; as it is now recognized that, though the carrier's check in payment for a claim may compensate for the market value of goods, there are other losses that it does not cover. For example, it does not cover the loss because of dissatisfied customers. If goods are continually received in bad order or not received at all, the customer is likely to look around to see if he can buy from some one who can get goods delivered promptly and safely.

Another example is found in connection with the transportation of eggs. The railroads and express companies are paying claims for millions of dollars a year on eggs, but there is no compensation for the purchaser of eggs who has to pay

more for them because the supply has been curtailed to the extent of the thousands of dozens that are broken in transit.

**2. Proper Handling Important.**—The fact that claims are a serious matter, both to the railroad and to the shipper, and that many of them are preventable, is becoming generally recognized, and earnest efforts are being made to reduce their causes. It is not to be expected, however, that there will ever come a time when there will be no cause for claims; therefore, it is important that the methods and documents used in the filing and collection of claims should be thoroughly understood.

It is an unfortunate fact that the managements of many concerns fail to realize the error of entrusting the handling of claims to those who do not know how to do the work properly. The effect of having claims in incompetent hands will manifest itself in three ways: (1) Claims without merit will be filed; (2) claims of merit will not be filed, through lack of knowledge that they are collectible; (3) valid claims will be held up or declined by the carriers.

Though the filing of claims without merit will not be reflected in a dollars and cents way that can be detected, the practice will nevertheless work injury to the claimant. First of all, it must be realized that the preparation and investigation of claims cost money, which means that both the claimant and the carrier have spent money unnecessarily when a claim without merit is filed. It is only natural to expect that the claimant who causes avoidable expense and work will feel the result in the treatment accorded his claims by carriers. A more tangible injury that may result from the filing of claims without merit, is that the man who files them is thus revealed to the claim departments of the carriers as a man who does not know his business, and he will have to suffer for this exposure of his ignorance.

It is not revealing any secret to say that the man who files claims is classified in the carriers' claim departments according to his record, (1) in displaying ability as a claim man by filing claims that have real merit, (2) in displaying honesty and fairness in his dealings relative to claims. From what has been

said, it should not be expected that a claim man will be able to collect every claim that he files, but rather that he should not file claims that a competent claim man would know could not be collected, or which can be collected only by means of false statements or other dishonest methods.

3. The points where an incompetent claim man may be expected to fail in connection with good claims may be enumerated as follows:

1. Valid claims are not filed, because it is not known that the carriers can be held liable for the loss, damage, or overcharge that has occurred.

2. Claims which are otherwise valid are not collected because they are not filed soon enough. The carriers specify on bills of lading and elsewhere, that claims must be filed within a specified time. This limitation is a provision that is enforced, with the result that claims, otherwise good, are all the time being rejected. The claim that is not collected because it was not filed in time is just so much money lost that should have been recovered.

3. Many claims are not paid, because it is not possible to produce essential papers. While there are cases where claims cannot be collected, because papers are missing, there are other cases where the wise traffic man knows how to offset such shortages; for example, by the use of a bond of indemnity where the original bill of lading cannot be produced. It is also true that essential documents would often not be missing if the man who handles claims would see to it that such documents are kept where they can be found when needed. It is a fact that bills of lading often lie around in the offices of business houses like pieces of scratch paper, until they are thrown away or put away by some one who looks upon them as a nuisance.

4. The settlement of valid claims is often delayed indefinitely by the failure of the claimant to furnish necessary documents or information. While it is not to be expected that everything that the carrier needs for the investigation will always be included when the claim is filed, there is little to be said for the man who omits furnishing the bill of lading as a

part of a claim where that document is necessary. Every day that a valid claim is held up waiting for additional information or documents means a day that the claimant is deprived of the use of funds that he should have. A smaller loss growing out of this same situation is the expense involved in the correspondence necessary to get the situation straightened out.

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#### POLICY IN HANDLING CLAIMS

**4. Honest Differences of Opinion Possible.**—Before taking up the discussion of the different kinds of claims and how to handle them, a word may be said as to the matter of policy in the performance of this important work. There is probably no part of the contact between shippers and carriers where the exercise of judgment is more important, and a give-and-take attitude must more often be assumed than in connection with the handling of claims.

The adjustment of claims is generally based upon: (1) the facts in the case; (2) the law; (3) the conditions of the contract under which the transportation was performed; (4) the filing of certain documents and information. Under these conditions, it is to be expected that there will be honest differences of opinion as to how a claim shall be adjusted.

For example, it may be comparatively easy to adjust a claim where one case is delivered to the carrier and lost while in its possession; but it is a more difficult matter to adjust a claim where goods are missing from a case that has been in the possession of truckmen as well as carriers, between the time when it was packed and the time when it was delivered to the consignee after having traveled several hundred miles.

The carrier may properly say that it does not take very long to open an ordinary case, remove the contents, and put the cover on again, and who can say absolutely just when the operation was performed? If safety-razor blades are taken out of a case and an equal weight of brickbats substituted, is it probable that the shipper who has a truckman haul the shipment to the railroad station will be in a position to prove that the case receipted for by the railroad did not contain the brickbats

that were in it when it reached destination? The above examples present only a few of the many opportunities for honest differences of opinion which may arise in handling claims.

**5. Not Advisable to Drive too Hard a Bargain.**---The man who is handling claims will do well to bear in mind, that, while he naturally wants to get all he is lawfully entitled to on each claim, some small advantage he may gain in one case may react to his disadvantage many times over in future claims. In many cases the carrier makes a proposition to compromise in the adjustment of a claim and to pay less than the amount for which the claim has been filed. In such a case the claim man will do well to give careful consideration to the action that he will take. It is sometimes said that a compromise is the sign of weakness; but it is a fact that compromises are made in the adjustment of claims for the same reason that they are made in other cases; that is, because the evidence does not seem to be sufficiently conclusive to warrant either an acceptance or a rejection of the original proposition in its entirety. In coming to a conclusion as to the acceptance of a compromise, there are two factors to which weight must be given: (1) that the individual claim is only one of many that must be adjusted with that particular carrier, and a sacrifice in this case may be made up many times over in other claims; (2) the alternative may be court action, which carries with it expense and the possibility of the complete loss of the case.

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#### TIME REQUIRED FOR INVESTIGATING CLAIMS

**6.** It often happens that a person who has a meritorious claim feels aggrieved because it is not immediately settled. It is not to be questioned that many claims are not settled as promptly as they might be; but it must be remembered that it is not only the right, but the duty, of the carriers to make a thorough investigation before paying claims. It is a fact that claims not only can be but have been used as a means of securing transportation at less than the lawfully published rates

For example, a shipper might pay the carrier the lawful published rate of \$1.00 per hundred pounds and immediately file a claim for an amount sufficient to give him back 10 cents per hundred pounds on the charges that he has paid. To the extent that this claim does not represent loss or damage to property it is a rebate from the published rate. The Interstate Commerce Commission has impressed upon the carriers the fact that it is their duty to investigate claims before paying them, as will be seen by reading Conference Rulings 236 and 462 shown below:

**236. Claims May Not Lawfully Be Paid Until They Have Been Investigated.** (Nov. 22, 1909.)—The Commission adheres to Conference Ruling 68, to the effect that it is not a proper practice for railroad companies to adjust claims immediately upon presentation and without investigation. The fact that shippers may give a bond to secure repayment in case, upon subsequent examination, their claims prove to have been improperly adjusted does not justify the practice. Carriers that have adopted that practice will be expected promptly to discontinue it. (See also ruling 462; also *Charleston & Car. R.R. v. Varnville Co.*, 237 U.S., 597.)

**462. Carrier Must Investigate Before Paying Claims.** (April 25, 1914.)—Upon further consideration, Conference Ruling 15 is modified as follows:

A carrier can not shield itself from responsibility in paying a claim by accepting the authority of a connecting line to pay it, but must ascertain the lawfulness of the claim and allow it or not upon the basis of its own investigation. This is not to be understood, however, as requiring each carrier interested in the claim to make an independent investigation. The principle of direct investigation embodied in the rules of the freight claim association, whereby the carrier against which a claim is presented undertakes to make the investigation for itself and for the other carriers concerned in the joint movement out of which the claim arises, is approved by the Commission as a means of expediting the adjustment of claims. In all cases, however, the investigation so made must be thorough and must disclose a lawful basis for payment before the claim is adjusted. (See ruling 236; also *Charleston & W. C. Ry. Co. v. Varnville Co.*, 237 U. S., 597.)

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#### TIME LIMIT IN FILING CLAIMS

**7. Lawful Limits.**—While the claim man cannot expect to collect every claim in whole or even in part, he should feel that he has failed to do his work properly, in most cases, if the



claim is rejected because it was not filed promptly enough to have it considered on its merits. Most contracts of shipment contain a provision as to the time within which claims must be filed, and provisions of this nature have repeatedly been held to be lawful, so long as the time provided is not unreasonably short or the provisions do not conflict with laws dealing with the matter. The provision of this kind which affects a considerable portion of domestic traffic is a part of Section 3 of the Uniform Bill of Lading, which is as follows:

Except where the loss, damage, or injury complained of is due to delay or damage while being loaded or unloaded, or damaged in transit by carelessness or negligence, as conditions precedent to recovery, claims must be made in writing to the originating or delivering carrier within *six* months after delivery of the property (or, in case of export traffic, within nine months after delivery at port of export), or, in case of failure to make delivery, then within six months (or nine months in case of export traffic) after a reasonable time for delivery has elapsed. Suits for loss, damage, or delay shall be instituted only within two years and one day after delivery of the property, or, in case of failure to make delivery, then within two years and one day after a reasonable time for delivery has elapsed; *Provided, however,* That where claims for loss, damage, or delay have been duly filed with the carrier and such claims have not been definitely declined in writing by the carrier before the beginning of the last six months of the two-year-and-one-day period, then suit thereon may be filed within six months from the date the claims are definitely declined in writing by the carrier, but not after. Where claims for loss, damage, or delay are not filed, or suits are not instituted thereon, in accordance with the foregoing provisions, the carrier will not be liable and such claims will not be paid.

It will be noted that these provisions are somewhat more liberal than is required by Section 20 of the Interstate Commerce Act, a part of which is quoted below:

That it shall be unlawful for any such common carrier to provide by rule, contract, regulation, or otherwise, a shorter period for giving notice of claims than ninety days, for the filing of claims than *four* months, and for the institution of suits than two years, such period for institution of suits to be computed from the day when notice in writing is given by the carrier to the claimant that the carrier has disallowed the claim or any part or or parts thereof specified in the notice.

**8. Proper Notice of Claim.**—In connection with what has been said, it should be understood that it is not necessary to file a claim in its complete and final form in order to satisfy the provisions relative to the time for filing claims. What is required is that the carrier shall have sufficient and definite notice, in some form, that loss or damage has occurred, so that it may assemble records, question employees, or take such action as may be necessary to protect its own interests when the claim is presented later in formal manner. There are certain methods of giving notice of a claim which meet the requirements just specified. One prevalent form of giving notice is through the medium of requests to carriers to trace undelivered shipments. While a request for a tracer is generally considered as a notice of a claim for loss or damage, it is customary to incorporate into tracers the following or a similar clause: "This tracer constitutes a claim for the value of all or any part of the shipment in the case of loss or damage."

**9.** Another method that may be adopted where conditions warrant, is to give notice of a claim when a shipment arrives in bad condition. This form of notice is advisable when the shipment shows at the time of receipt that some of the contents are damaged or missing, but the exact extent of the loss or damage cannot be determined until the shipment has been entirely unloaded, inspected, and damage calculated. The practice in cases like this is to file notice of a claim for a specified amount subject to revision later on. When the shipment has been finally taken care of, the claim can be filed for the exact amount, or it may be withdrawn if it appears that the first indications of loss or damage are not borne out by later developments. For example, when a car of fruit is opened, the contents around the doorway may appear to be in a decayed condition; but when the car is unloaded, it may be found that this condition applied only to a small amount that was first visible, and that the loss does not justify a claim.

**10.** A precaution that may be taken as a preliminary to filing a claim is to notify the carrier that loss or damage is apparent, so that, if the carrier desires, an inspector may be

sent to look over the shipment, the condition of the car, etc. An opportunity to inspect loss and damage to shipments is a right of the carriers, and failure to give such an opportunity for inspection may result in the rejection of the claim. The inspector's report is often an essential document in the settlement of claims. In any event a notification of the bad condition of a shipment will serve as a notice that a claim is in order.

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#### WITH WHICH CARRIER TO FILE CLAIMS

**11.** A question in connection with claims, which would be of material importance if there were any definite answer to it, is the question as to which carrier is the proper one to file a claim with. For example, where three carriers have effected the delivery of a shipment, should the claim be filed with the initial, intermediate, or delivering carrier? There can be no definite answer to this question, because conditions and an exercise of judgment must determine where a claim should be filed. At first glance it would seem that the proper place to file a claim would be with the initial carrier, in view of the following quotation from Section 20 of the Interstate Commerce Act:

(11) That any common carrier, railroad, or transportation company subject to the provisions of this Act receiving property for transportation from a point in one State or Territory or the District of Columbia to a point in another State, Territory, District of Columbia, or from any point in the United States to a point in an adjacent foreign country shall issue a receipt or bill of lading therefor, and shall be liable to the lawful holder thereof for any loss, damage, or injury to such property caused by it or by any common carrier, railroad, or transportation company to which such property may be delivered or over whose line or lines such property may pass within the United States or within an adjacent foreign country when transported on a through bill of lading, and no contract, receipt, rule, regulations, or other limitation of any character whatsoever, shall exempt such common carrier, railroad, or transportation company from the liability hereby imposed;

Experience shows that there are many considerations other than this strict legal responsibility which may determine with whom a claim shall be filed. One factor that often determines where a claim should be filed is the question of what carrier is

responsible for the claim. It must be remembered that carriers investigate claims to determine whether or not a cause for a claim exists and, if it does, who is responsible for it. Under such conditions it is usually a loss of time to file a claim in one place when it is known that the responsibility lies elsewhere. For example, if a car were destroyed on the lines of the delivering carrier, it would usually involve a loss of time to file the claim with the originating carrier. Again, it is often desirable to follow the policy of filing claims with carriers who consider the prompt handling of claims as a measure of good service in holding desirable business. While it is not legal or honest to use the settlement of claims as a bribe for the distribution of business, it is entirely justifiable to favor those lines that see to it that valid claims are settled in as short a time as a thorough investigation warrants.

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#### PREVENTION OF CLAIMS

12. Many times the cause of claims may be avoided by foresight on the part of the traffic man in taking certain precautions which the rules or the law may not actually require of him; and in so doing he is serving his employer's interests better than if he merely did what the rules require and then collected the claims that might accrue. The fact that the amount of claims collected shows plainly in figures, while troubles avoided cannot be so definitely pointed to, should not be allowed to influence his action.

Overcharge claims are often the result of clerical errors, and some of these which the traffic man may be able to prevent are as follows:

One source of overcharges by the carriers is the assessing of a class rate instead of a commodity rate or some other special rate. As the shipper may be more familiar with the rates on his traffic than the railroad billing clerk is, an overcharge in the billing may be prevented if the shipper inserts what he believes to be the correct rate on the bill of lading. The insertion of the rate will call attention to the rate that the shipper believes to be the right one, and if there is any difference of opinion on the matter it can be settled immediately.

A second precaution for reducing the number of claims is the prompt checking of freight bills. When this is done, if there are any errors they may be adjusted before the bills are paid or before the carrier that rendered the bill has settled with its connecting lines. For example, if an error in the charges has developed between the point of origin and the destination, it may be that the submission of the bill of lading will be accepted as evidence of the correct charges.

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#### HOW THE CARRIERS HANDLE CLAIMS

**13. Steps in Adjustment.**—In the collecting of claims, it will be a great help to know how the carriers handle them. The general method is as follows:

A claim may be filed with the freight agent or the freight-claim department of the carrier, but the freight-claim department will have charge of the investigation and adjustment of the claim.

As a first step, after a claim has reached the claim department, a number is assigned to it. This claim number will be furnished to the claimant by means of a postal card or other notification, and he should take care to see that his records are made to show this number, as it will thereafter be necessary for him to use it when writing to the carriers about the claim. Where receipt of a claim is not promptly acknowledged, it will be well to take action to see if the claim was received by the carrier. If it was, the number should be secured; if it was not, duplicate papers should immediately be filed if the originals cannot be found. It is particularly essential that receipt of a claim should be verified where the time within which the claim must be filed is nearly up, as otherwise the limit may be passed without the papers getting into the hands of the carriers.

When the number is assigned to a claim, all the papers are attached to a back of cardboard or other stiff material, the papers of the claimant being first, or at the bottom, with those received later on the top; and when once papers have become part of a claim they are not to be removed from the file.

One of the first things done by the claim department is to check the papers filed by the claimant to see that bills of lading and other essential papers are attached. If any are missing, a request is immediately sent out for the missing papers.

**14.** With the required papers in hand, the real investigation of the claim begins. Just what will be the first step in such an investigation will depend upon conditions in the individual case. Some of the steps that may be taken will be to refer the papers to the agent at the point of origin, to refer them to the connecting line, or to ask the claimant for any special information that may not have been included in the papers originally filed. For example, an affidavit as to how the amount of the claim was arrived at may be requested.

**15. Rules of the Freight Claim Association.**—In order that it may be appreciated that the investigation of freight claims is not a haphazard matter, nor one that is dependent upon the ideas of the claim officer of a single carrier, let it be said that the activities of most railroads and many boat lines in this country are largely regulated by the rules of the Freight Claim Association, which is an organization of freight-claim officers throughout the United States. Many carriers not members of the association abide by its rules, wholly or partly.

While these rules deal in some important respect with the subject of claims as a matter of adjustment between the carriers and the public, they serve what is perhaps a more important matter, by providing a definite method for the adjustment of claim matters between carriers. It is often the case that, while there is no doubt that a shipment has been lost or damaged in the possession of the carriers, there is a doubt as to just where or how the loss or damage occurred. In such a situation, the payment of the claim might be held up while the carriers were attempting to place the responsibility upon some individual carrier.

The Freight Claim Rules make definite provision for the adjustment of claims where there is a question as to which carrier is responsible. For example, the originating carrier's



records may show that five cases were loaded into a certain car, but the carrier to whom the car was delivered may have a record of receiving only four cases. Such a situation would be a source of difference of opinion that would eventually have to be decided, as there is no question that the shipper delivered five cases and expects to be paid for the missing case. The Freight Claim Rules make provision for the adjustment of this and a great many other situations where there is no way to say certainly that one or the other of two or more parties to a controversy is right or wrong.

In cases where the rules do not provide a method of adjustment that will prove satisfactory, the matters at issue may be arbitrated in a manner definitely provided for. Though the public does not come definitely in contact with the rules of the Freight Claim Association, it is benefited by the definiteness and uniformity which now characterize the adjustment of claims as a whole. If, in the individual case, some of the rules of the association appear to be unnecessary "red tape," it should be remembered that any specific rule is likely to work hardship at times.

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#### RECORDING AND TRACING OF CLAIMS

**16. Records.**—The keeping of records and the filing of duplicate sets of claim papers for reference in the claimant's office are matters of importance. From the claimant's point of view, claims fall into three classes: (1) those that have been paid; (2) those that are under investigation; (3) those that have been declined by the carriers. Only those that have been paid may safely be filed away where they are not easily accessible, and even these should be kept, at least for a time, where they can be reached if required. Situations sometimes arise where it is desirable to refer to the records of settled claims, as in case the carrier suggests that some claim under investigation is a duplicate of a claim already paid.

Even though a claim man may agree with, or at least decide to accept, the declination of a claim under conditions obtaining at the time of declination, there are sometimes developments



that will justify the revival of a claim. For example, a court decision may reverse previous holdings, and make valid, claims thought to be dead. Claims of this class are more liable to come into active service again than are adjusted claims, and should be kept reasonably accessible, although not in a current file such as is used for claims under adjustment.

While the carrier's claim number will be the most essential one in corresponding with the carriers, the claimant should assign a number of his own when he starts to assemble papers preparatory to filing a claim. This number should appear on all correspondence relative to the claim, whether with the carriers or others. As it is common practice to number claims

### Tracer—Overcharge Claim

	(Address)	
		, 19
	(Date)	
MR.....	R. R. Claim No.....	
(Name and title of person)		
.....	Our Claim No.....	
(Name of Carrier)		
.....	Overcharge Amount.....	
(Address)		

DEAR SIR:—

Claim as numbered above was filed with your office under date of ....., 19.... As claim voucher has not been received, please advise present status and when we may expect adjustment.

Yours very truly,

.....  
(Claimant)

FIG. 1

in consecutive order, it may be desirable to use a designating letter in connection with the number, to call attention to the fact that such number and letter constitute a claim number and are not the ordinary correspondence-file number.

Though many concerns keep their claim records on cards, generally a book record in the form of a claim register will prove more satisfactory. The information recorded in a claim register will necessarily vary with conditions, but it should be sufficient so that there will not be need to refer to the papers themselves except for details, as in the case of correspondence.

**17. Tracing of Claims.**—While there has been a decided improvement in the methods of the carriers in the investigating and settling of claims, the time has not yet arrived when a man may file a claim and forget it until he receives his check in payment or advice that the claim has been rejected. In other words, some provision should be made to keep a watch on claims that have been filed, so that if a claim is not definitely known to be proceeding toward settlement with reasonable speed, the carrier will be asked to give information in regard to its status. Forms similar to Figs. 1 and 2 are useful in tracing claims.

**Tracer—Loss and Damage Claim**

.....		(Address)
.....		....., 19.....
.....		(Date)
MR. ....	R. R. Claim No.....	
(Name and title of person)		
.....	Our Claim No.....	
(Name of carrier)		
.....	Loss and/or Damage Amount....	
(Address)		

DEAR SIR:—

Claim as numbered above was filed with your office under date of ..... 19..... As claim voucher has not been received, please advise present status and when we may expect adjustment.

Yours very truly,

.....  
(Claimant)

FIG. 2

It is not possible to lay down any rule as to what constitutes a reasonable time for adjusting a claim, but the Interstate Commerce Commission has indicated its belief that interest should not be charged on overcharge claims until 30 days after the claim is filed. In other words, the Commission feels that the carrier is entitled to not less than 30 days for the investigation of an overcharge claim, and such claims can generally be investigated more easily and quickly than can loss and damage claims. It is not uncommon for three or more lines to be involved in a claim, which means that employes and records at widely separated points must be examined, after which it may

be necessary to assemble and analyze a mass of conflicting evidence. A complex situation as to facts may be further involved by legal questions of material difficulty.

**18.** Regardless of the difficulties which delay the settlement of a claim, it should be carefully watched and followed up, so that if, for example, records show that a claim was filed 6 months ago, and has not yet been adjusted, there should be information to show that the claim has been delayed for sufficient causes, which are known to the claimant.

If the number of claims being handled is small, an occasional check of the claim register or the file of unadjusted claims may be sufficient to bring to notice claims that have been unduly delayed. If the number of claims handled is large, a follow-up card system may be used, so that the claim will come up for tracing if nothing has been heard of it by a certain date, after which the card may be set ahead for another period. In some cases, the carrier will state that the claim is in the hands of connecting lines, in which case it may be desirable to trace the connecting line. When it is necessary to do this, as complete information as possible should be given as a means of identification; for it must be borne in mind that the connecting line is not so familiar with the claim as is the carrier with whom the claim is filed.

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#### SEALS

**19. Seals and Their Use.**—In the adjustment of loss and damage claims, the matter of seals and records of them is of great importance. The significance of seals will be made plain by the following explanation:

When a box car has been loaded and is ready to start on its way to destination, the doors are fastened shut by means of seals, except in a limited number of cases where locks are used. There are various forms of car seals, all designed to insure that if the door is opened the fact will be made evident by the condition of the seals.

One commonly used form of seal consists of a wire with a piece of lead on one end. When it is desired to seal the car door,

the free end of the wire is passed through the hasps of the door and is bent over until it rests on the lead on the other end, after which the wire is pressed into the lead by means of a sealing press. In order that it may be definitely determined where a seal was applied, the press not only forces the wire into the lead, but at the same time makes impressions of numbers or letters or both on the lead.

Another form of seal in common use is the ball seal. This seal has a ball attached to one end of a piece of tin, and in use the free end of the tin is passed through the hasps and inserted into the ball, where it locks automatically and cannot be withdrawn without breaking the ball or the tin. The identification in this form of seal is provided by numbers, letters, etc., stamped on the strip of tin. Thus, there may be a number on one side and the name of the industry or road that attaches the seal on the other.

**20. Significance of Seals.**—Once a car has been sealed, a record of the numbers and other identifying marks on the seals is kept by shippers, freight agents, conductors, and others who may be interested in or responsible for the delivery of the car. The adjustment of a claim often hinges upon such records. For example, if a car is delivered at destination with the original seals unbroken, it is difficult to substantiate a claim that property has been lost from it in transit. But if any of the seals is missing, the responsibility for accounting for missing freight is upon the carrier.

Again, a car may be delivered fully sealed, but with different seals on it than it had when it left the point of origin, which is evidence that the car could have been opened in transit. For this reason, the consignee should note carefully the condition of the seals on the car and whether they are the original ones. The carrier's records will probably show where a new seal was put on and the reasons for doing it.

There are many conditions under which a car could reach destination with changed seals. It might be that the car was merely opened for inspection and that there was no opportunity for tampering with the contents in transit, the original

seal having been broken and the new seal having been applied by authorized employes of the transportation companies. In such case the change of seal would not of itself be evidence that missing property had been lost by the carrier.

On the other hand, the car may have left the point of origin with the original seals in good condition, but have reached some point in transit with one or more seals gone, with no evidence of how they were removed, and the new seal may then have been put on to guard against the possibility of further loss. The existence of such a condition would be good evidence that the car had been unprotected long enough to have been opened and goods taken out.

In both instances just mentioned, the carriers have the advantage of having records that show just what did happen, but the consignee should make a record of and call the carrier's attention to the changed seals if he thinks any change has been made, for the burden of explanation of such change is on the carrier.

**21.** From what has been said, it will be evident that shippers, consignees, and carriers should give careful attention to seals and should record their condition. Where shippers do the sealing of cars, they should exercise great care to see that the work is carefully done. Many cars have end doors as well as side doors, and these end doors offer just as good an opportunity for pilferage as the side doors. To seal the side doors and leave end doors unsealed is much like locking the front door of a house and leaving the back door open.

In general, where cars are delivered to the consignees with the original seals intact, the carriers will make strenuous efforts to show that they are not responsible for the alleged shortage, on the ground that nothing could have been taken out of the car without the seals showing that they had been tampered with. There are, however, exceptions to the fact that an unbroken original seal disproves loss; some of these are in case of grain or liquids, which may run through small openings. It is a matter of record that holes have been bored through the floors of cars to allow the contents of the cars to run out.

It is also possible for the bottoms of the doors of some cars to be forced open far enough for thieves to reach into the cars, or to push a small boy into the car without breaking the seal.

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### FILING AND COLLECTING CLAIMS

**22. Classes of Claims.**—Claims may be divided into three general classes as follows: (1) Overcharge, (2) loss, (3) damage. It is very common to consider the loss and damage claims together, because of their close relationship, and the two latter classes may be subdivided into claims for concealed loss or damage, and for known loss or damage, and for loss or damage due to delay, the meaning of which terms will be explained later.

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### OVERCHARGE CLAIMS

**23. Definition.**—Overcharge claims, as the name indicates, are claims for the return of money which the carriers have collected in excess of the correct amounts; of the three classes of claims previously mentioned, they are the only kind upon which interest can be collected. The Interstate Commerce Commission has dealt with this matter very specifically in Conference Ruling 489, shown following:

**489. Interest Upon Overcharge Claims.** (Feb. 18, 1916.)—Conference Ruling 464 amended and restated.

Interest on an overcharge (by which is meant the amount collected on a shipment in excess of the legally published rate) accrues from the date of its collection by the carrier, whether arising from an error in rate, weight, or classification.

The Commission does not regard it as unlawful for a claimant to accept in satisfaction of his claim the ascertained amount of an overcharge without interest; and the Commission is of the opinion that when such a refund is made by the carrier within 30 days after the improper collection of the overcharge, it may be regarded, in accordance with a well-established usage, as a cash transaction, upon which interest does not accrue.

The views expressed in this ruling shall be understood as applying to all pending and unsettled overcharge claims and to those arising in the future, but not as authorizing or requiring the reopening of any claim which has been settled and closed by the acceptance by a claimant of the

amount of an overcharge without interest. (See *Scattergood & Co. v. L. S. & M. S. Ry. Co.*, U. R. Op. 2040; and *International Lumber Co. v. C. N. Ry. Co.*, 40 I. C. C., 283.)

**24. Causes of Overcharges.**—Overcharge claims result from the following causes: (1) The collection of a rate higher than the one properly applicable; (2) incorrect classification of property (this is really one phase of the first cause); (3) collecting of charges from shipper or consignee which should have been collected from some carrier; (4) charges based on weights greater than the correct ones; (5) the duplication of collection of charges, as in the case where charges are prepaid, and the carrier at destination also collects them. In the adjustment of claims of the first three classes, tariff authority must always be quoted to substantiate the claim, although any of the classes may be adjusted on the basis of facts in individual cases.

**25. Forms for Claims.**—As a means of insuring, as far as possible, that correct and complete information shall be filed in connection with claims, the Freight Claim Association, the Interstate Commerce Commission, and various representatives of shipping interests have developed a series of forms for use in filing claims, which forms are referred to and illustrated in the following pages. These forms call for items of information and the submission of documents on a more extensive scale than is generally required in connection with any *one* claim of the class with which they are filed, but the forms serve to show about everything that will help to make a claim the complete set of exhibits that it should be. While the use of these forms is not made mandatory, and many claimants do not use them, there is no doubt that they are very helpful to claimants and carriers in many ways.

**26. Documents Required for Collecting Claims.**—Overcharge claims are the one class of claims where the bill of lading is not always considered an essential document, although it contains so much information about the shipment, that the original or a copy may well be filed, even if it is not absolutely necessary. In such cases as claims for overcharges resulting from misrouting of freight, or from the collection of charges at



destination after they have been paid at the point of origin, the bill of lading will be necessary. The receipted freight bill is required in all overcharge claims.

### Indemnity Agreement

Date.....

File No.....

We, the undersigned, being unable to produce or supply the.....  
 Railroad or its connections with the {Original Paid Freight Bill}  
 {Original Bill of Lading } covering the shipment hereinafter described,  
 do hereby indemnify and save it, and other interested carriers, if any, harmless from and against any damages  
 in any way whatsoever connected therewith or arising therefrom. The {Original Paid Freight Bill}  
 {Original Bill of Lading } cannot  
 be produced for the following reason:.....  
 .....

### DESCRIPTION OF SHIPMENT

Articles.....  
 .....

Consignor..... From.....

Consignee..... At.....

Date..... Car No. and Initial..... Via.....

Freight Bill Pro. No. .... Date..... Issuing Railroad.....

Bill of Lading No. .... Date..... Issuing Railroad.....

(Signed).....  
 .....

FIG. 3

27. In cases where bills of lading, freight bills or other necessary documents cannot be produced, a bond of indemnity or an indemnity agreement, such as shown in Fig. 3, may be

filed to protect the carriers against damages for which they might be held by any one who presented the bill of lading or other document as proof that he was the owner of the ship-

## Standard Form for Presentation of Overcharge Claims

Approved by  
THE INTERSTATE COMMERCE COMMISSION  
THE NATIONAL INDUSTRIAL TRAFFIC LEAGUE  
THE FREIGHT CLAIM ASSOCIATION

(Name of person to whom claim is presented) \_\_\_\_\_ (Address of claimant) \_\_\_\_\_  
(Name of carrier) \_\_\_\_\_ (Date) \_\_\_\_\_  
Address \_\_\_\_\_

(Claimant's Number) \_\_\_\_\_

(Carrier's Number) \_\_\_\_\_

This claim for \$ \_\_\_\_\_ is made against the carrier named above by \_\_\_\_\_  
(Amount of claim) (Name of claimant)  
for Overcharge in connection with the following described shipments:

Description of shipment \_\_\_\_\_

Name and address of consignor (shipper) \_\_\_\_\_

Shipped from \_\_\_\_\_ To \_\_\_\_\_  
(City, town or station) (City, town or station)

Final Destination \_\_\_\_\_ Routed via \_\_\_\_\_  
(City, town or station)

Bill of Lading issued by \_\_\_\_\_ Co.; Date of Bill of Lading \_\_\_\_\_

Paid Freight Bill (Pro) Number \_\_\_\_\_; Original Car Number and Initial \_\_\_\_\_

Name and address of consignee (Whom shipped to) \_\_\_\_\_

If shipment reconsigned en route, state particulars \_\_\_\_\_

Nature of Overcharge \_\_\_\_\_  
(Weight, rate, or classification, etc.)

### DETAILED STATEMENT OF CLAIM.

Note.—If claim covers more than one item taking different rates and classification, attach separate statement showing how overcharge is determined and insert totals in space below.

	No. of Pcs.	ARTICLES	WEIGHT	RATE	CHARGES	AMOUNT OF OVERCHARGE
Charges Paid.						
		Total				
Should have been						
		Total				

Authority for rate or classification claimed \_\_\_\_\_  
(Give, so far as practicable, tariff reference (I. C. C. number, effective date and page or item).

### IN ADDITION TO THE INFORMATION GIVEN ABOVE, THE FOLLOWING DOCUMENTS ARE SUBMITTED IN SUPPORT OF THIS CLAIM.\*

- ( ) 1. Original paid freight ("expense") bill.
- ( ) 2. Original invoice, or certified copy, when claim is based on weight or valuation, or when shipment has been improperly described.
- ( ) 3. Original Bill of Lading, if not previously surrendered to carrier, when shipment was prepaid, or when claim is based on misrouting or valuation.
- ( ) 4. Weight certificate or certified statement when claim is based on weight.
- ( ) 5. Other particulars obtainable in proof of Overcharge claimed.

Remarks \_\_\_\_\_

The foregoing statement of facts is hereby certified to as correct \_\_\_\_\_

Signature of claimant \_\_\_\_\_

\*Claimant should attach to each claim a number, inserting same in the space provided at the upper right hand corner of this form. Reference should be made thereto in all correspondence pertaining to this claim.

\*Claimant will please place check (X) before each of the documents mentioned as have been attached and explain under "Remarks" the absence of any of the documents called for in connection with this claim. When for any reason it is impossible for claimant to produce original bill of lading if required or paid freight bill claimant should indorsely carrier or carriers against duplicate claim supported by original documents.

\*Claims for overcharge on shipments of lumber should also be supported by a statement of the number of feet, dimensions, kind of timber and length of time up stairs before being shipped.

Claims based on rates quoted in letters from traffic officials should be supported by the original or copies of such letters.

FIG. 4

ment. For example, a carrier might pay a claim to a certain party only to have some one else come along and demand that payment be made to him on the strength of his possession of the bill of lading.

The use of the bond of indemnity is not confined to claims, as it is often used in cases where it is desired to secure possession of the shipment without surrendering the order bill of lading, and in other situations. There is no uniformity in the forms of agreement or bond which the carriers require to be signed, nor is there any rule as to the relation that the amount of the bond must bear to the actual value of the shipment. Thus in one case the carrier may require that it be made for twice the value of the shipment, while in some other case it may be made for three times the value of the shipment. As the carriers may be held for other damages than the mere value of the shipment, they usually take precaution to guard against all contingencies.

One of the forms already referred to as recommended to be used in connection with the filing of claims, is shown in Fig. 4. This form is especially adapted to overcharge claims, and careful study of it will furnish a comprehensive view of the documents and information that may be necessary in the successful handling of this class of claims, although everything called for on this form would not come into play in one claim.

**28.** In filing claims for overcharges in rates, reference must be made to the tariff or tariffs that are relied on to support the claim. Such reference should be as specific as possible. If the traffic is governed by tariffs subject to the jurisdiction of the Interstate Commerce Commission, the I. C. C. Number (which number appears in the upper right hand of the title page of the tariff) should be shown. Where the traffic is not subject to the jurisdiction of the Interstate Commerce Commission, such other identifying marks as are available should be used; for example, the number under which the tariff is filed with a state regulating body might be used.

If the tariff or other publication depended upon to support a claim is of any considerable size, reference should be made to the page or item number that contains the supporting evidence.

This is important, for such publications as the Consolidated Classification or the Transcontinental Tariffs may contain support for different arguments, according to the part of the

### Affidavit Concerning Weight and Quantity of Material

State of .....  
County of ..... S.S.

Before me, the subscriber ..... in and for said County

and State, personally came ..... who being by me duly sworn, did say

that { he is } employee of .....  
          { they are }

that { he } loaded Car No. ...., Initial ..... , forwarded ..... 19 .....

consigned to ..... and that to the

best of { his } ability, knowledge and belief that said car contained when shipped...  
          { their }

weight .....

(Signed)

Subscribed and sworn to before me this

..... A.D. 19 .....

In Testimony Whereof, I have hereunto  
set my hand and Notarial Seal, the day  
and year aforesaid.

FIG. 5

publication that is referred to. For example, where tariffs are issued in numbered sections the rate claimed to be excessive may appear in the same tariff with the one that is claimed as correct.

**29.** Where an overcharge claim is based upon charges for excessive weight, it will depend upon circumstances as to what documents should be filed to support the claim. In some cases the invoice will serve the purpose, while in other cases a weight certificate will be the determining factor. In some lines of business, such as the grain business, there are often official weighers whose certificates are recognized by all concerned. Where estimated weights based upon agreements between shippers and carriers are depended upon, a copy of the agreement should be filed. It is not generally the case that weights based upon the use of small platform or wagon scales will be accepted against weights shown by railroad track scales, or other forms of weighing that are considered more reliable. Fig. 5 is a form of affidavit relative to weight.

**30.** Though overcharge claims as a whole are adjusted upon the basis of tariffs, certificates, etc., there are many cases where the physical conditions surrounding the property must be considered. For example, where the carrier has assessed charges on the basis of a machine "set up," and the shipper claimed that it was "knocked down," it might be necessary to inspect the machine in the condition in which it was shipped in order to determine the proper classification. In one case reported, a shipment of wheels and axles accompanied a shipment of freight cars and the question arose as to whether the wheels and axles were a part of the cars with which they were shipped, or whether they were to be used as repair parts for any cars that might need them. Only careful inspection of the conditions in such a case would furnish the necessary information.

**31. Reparation Claims.**—While overcharge claims are usually based upon charges other than those which should have been collected under published provisions, there are claims that are based upon what should have been published. For example, if the carriers intended to publish a rate of 60 cents

per hundred on certain traffic, but through a clerical error they published a rate of 90 cents, there would be a published rate 30 cents higher than was intended. Though the carriers did not intend to publish the higher rate, they are obligated by the Interstate Commerce Law to collect rates as they are published, and so they have to collect charges on the basis of the 90-cent rate. If they want to refund the difference between the rate they published and the one they meant to publish, they will have to secure permission from the Interstate Commerce Commission to make the refund, if the rates are subject to the jurisdiction of that body.

A special form (not shown here) has been provided by the Commission for use when the carriers ask permission to make a refund of published charges. In this form they have to show why they ask permission to make such a refund, and it is within the power of the Commission to allow such a refund, or to refuse to allow it, as they see fit. In the case to which reference has just been made, it is safe to assume that a refund would be authorized, if it could be established that the publication of the high rate was really a clerical error. Claims based upon errors in published charges are known as *reparation* claims.

In connection with reparation claims, it is important to note that the request to the Commission for permission to refund, as in the case just referred to, is made by the carriers. The one who paid the charges to the carrier will usually handle the matter in the same way as other overcharge claims, although the carriers will sometimes make the necessary application to the Commission without requiring claims to be filed in the regular way. There are, however, cases where the claimants and the carriers cannot agree as to what the tariffs provide, in which case it may be necessary to file a formal complaint with the Interstate Commerce Commission and have an investigation and decision by that body.

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#### CLAIMS FOR LOSS

**32. Explanation.**—While, as has been shown, documents and publications play a very important part in the adjustment of overcharge claims, it will be found in the adjustment of

loss and damage claims that the essential feature is facts, except as tariff provisions or legal considerations may affect the adjustment in individual cases. In general, the questions to be answered are, how much freight was delivered to the carrier? was it lost or damaged in transit? was the carrier responsible for the loss or damage, etc.?

Both loss and damage claims may be divided into three classes: Claims for (1) known loss or damage, (2) concealed loss or damage, (3) loss or damage by delay. The term "known," as applied to either loss or damage, indicates that which is known to the carrier before or at the time of delivery, while "concealed" indicates that which is not apparent until after the consignee has taken delivery. For example, if ten cases are delivered to the carrier and only nine are delivered to the consignee, the loss would be designated as a *known* loss. On the other hand, the ten cases might have been delivered to the consignee in apparent good order, but it might have been found that some of the contents of the cases were missing when the consignee opened them, in which case it would be said that there was *concealed* loss. Claims of the latter class are naturally the most difficult and unsatisfactory to handle, because of the difficulty of determining who is responsible.

**33. Claims for Known Loss.**—The three documents that are practically always essential in filing claims for known loss are the bill of lading, the freight bill furnished by the carrier at destination, and the original or a certified copy of the invoice. What other documents or evidence will be required will depend upon conditions in the individual case. If the form for the presentation of loss and damage claims shown in Fig. 6 is used, it may present some suggestions as to what else will make the claim complete.

The settlement of a claim for known loss will be expedited by having the carrier's agent note the shortage on the freight bill. The consignee should also exercise care to see that the receipt given the carriers accurately describes what is received, both as to quantity and condition.





have a man available to make an inspection at short notice, the consignee will be on record as having notified the carrier of the conditions, and this fact may help in the collection of the claim. In many instances the contents of cars can be unloaded into receiving departments, warehouses, etc., where the carrier can make inspections later on.

**34.** Where the shortage is in weight, a very essential feature will often be to establish that there actually is a shortage. It is often true that apparent shortages in weight are discrepancies in records or are errors in weighing, rather than actual shortages. For example, it may happen that a shipment is billed as weighing 50,000 pounds at the point of origin and shows only a weight of 47,000 pounds at destination. Investigation might show that the weight at the point of origin was obtained on scales the accuracy of which could not be taken as final, while the scales at destination may be of recognized accuracy, and there might be nothing to show that it was possible for any of the property to be lost in transit. Again, there may be a discrepancy in the weights, while the number of packages may agree with the count at the point of origin, in which case it would probably be found that the apparent shortage in weight was in reality an error in weighing.

**35. Claims for Concealed Loss.**—One distinctive feature of claims for concealed loss is that the consignee has generally signed a receipt for the property without noting any exceptions. For example, a consignee may sign a clean receipt for ten cases when he takes delivery from the railroad, only to find when he unpacks the cases that some of the contents is missing from three of the cases.

The fact that a clean receipt has been given does not bar the collection of a claim, if the loss was not visible when the receipt was signed, but it will be necessary to present explicit evidence of the shortage.

As a first step in handling claims for shortage of this kind, the carrier should be notified when a shipment checks short. This is necessary because the carrier will want to make an inspection of the freight; for the condition of the packages may

throw light on the cause of the loss or it may show that the packages could not have held the amount of goods on which

### Standard Form for the Handling of Concealed Loss and Concealed Damage Claims.

#### CONSIGNEE'S FORM

Information in Lieu of Affidavit Required from Consignee in Support of Claim for Concealed Loss or Concealed Damage.

Shipper's Claim No. ....

Consignee's Claim No. ....

#### DESCRIPTION OF SHIPMENT

Point of Origin ..... Destination .....

Date ..... Number of Packages .....

Shipper ..... Consignee .....

Commodity .....

INFORMATION REQUIRED	ANSWERS
1. Was the shipment handled by your own truck?	
(a) If not, give name of trucking company.....	
(b) Give name of driver in either case, if known.....	
(c) If not received by truck, state how received.....	
2. On what date was shipment received at your place of business?	
3. On what date was loss or damage discovered?.....	
(a) By whom discovered?.....	
4. On what date was carrier notified of the loss or damage?....	
(a) Who was notified of loss or damage?.....	
(b) If inspected, by whom and on what date?.....	
(Note.—Attach hereto any report inspector made.)	
5. What condition of contents, wrappers or cartons indicated loss or damage?	
6. Kind of package.....	
(a) Of what material constructed?.....	
7. Was examination of container made before opening?.....	
(a) Was examination of container made after opening?.....	
(b) What evidence was there, if any, indicating that the container had been tampered with?.....	
(c) Was container sealed, strapped or corded?.....	
8. Was the container packed to its full capacity with the property shipped?.....	
(a) If not, what material occupied the remaining space?....	

I hereby certify the foregoing statement of facts to be true in every particular, to the best of my knowledge and belief.

Dated at ..... 192 .....

Signature.....

Date ..... 192 .....

In what capacity employed.....

FIG. 7

the claim is based. It not infrequently happens that, through errors in invoices or in other ways, the consignee has received

erroneous records as to what he should have received. In such cases correspondence with the shipper will straighten out the matter.

### RAILROAD INSPECTION LOSS OR DAMAGE REPORT

..... Railroad Co.

#### INSPECTION REPORT OF LOSS OR DAMAGE DISCOVERED AFTER DELIVERY OF FREIGHT

Shipment of..... From.....

Consignor..... Consignee.....

Way-bill..... Date..... Pro. No..... Car No..... Initials.....

Date shipment arrived..... Date and hour delivered.....

Name of drayman..... Date and hour received by consignee.....

Were goods unpacked before this inspection was made?.....

When did consignee give notice or request inspection?.....

If shortage claimed what evidence did you discover indicating robbery during transportation?.....

Was there sufficient space in package to contain missing goods?.....

Did comparison of check with invoice, or weighing package verify loss?.....

If wooden box, was it new?..... Was it corded or strapped?.....

If fibre-board box, were flaps sealed and glued?.....

If similar inspections made of previous shipments for this consignee state circumstances and results.....

If damage claimed, did package or contents indicate the cause?.....

Was damage of such nature that it could have been noticed at time of delivery?.....

If improperly boxed, crated, wrapped or packed, what change would reduce liability to damage?.....

State fully any additional facts or information that may have material bearing upon the question of carriers' responsibility for the loss or damage claimed. If necessary, attach special memorandum hereto:

Station..... Date..... Inspector.....

Inspection of freight after its delivery may be made upon request of consignee whenever carrier's responsibility for loss or damage is in evidence. It is not expected that consignees will request inspection of freight their examination of which fails to disclose any indication of the cause for loss or damage, or after shipment has been delivered more than forty-eight hours.

A copy of this report may also be given consignee upon request.

This report must invariably be filed with Agent making delivery of shipment.

FIG. 8

In addition to the standard loss and damage form shown in Fig. 6, attention is called to Figs. 7 and 8, which are forms peculiar to concealed loss and damage claims. It will be noted that Fig. 7 is to be filled out by the party filing the claim, while Fig. 8 is to be filled out by the carrier's inspector. As these two documents call for information on many of the same

### Affidavit Concerning Shortage

State of.....	} ss.:
County of.....	
.....being duly sworn, says: That on	
the.....day of....., 19.....	
checked the contents of.....	{ shipped to car number } .....
{ at .....	} as the said contents were
{ which carried seal number.....and.....	
removed from said shipment, and that they consisted of the following:	
.....	
.....	
.....	
.....	
.....	
[ SEAL ] .....	
.....	
Subscribed and sworn to before me this.....	Signed.....
day of....., 19.....	.....
.....	.....
Notary Public.	.....

FIG. 9

points, the adjustment of the claim will be expedited if the claimant and the inspector can agree as to facts.

**36. Importance of Affidavits.**—Affidavits play a more or less important part in all kinds of claims, but they are particularly essential in connection with concealed loss and damage claims, because the affidavits are presumed to repre-

sent sworn statements from those who are in a position to give specific evidence as to the exact conditions surrounding a claim. Therefore, they should be extensive enough to cover the subject as far as is consistent with the actual knowledge of the one who makes the affidavit. For this reason, it follows that affidavits should be made by the one who handles the shipment, or who has personal knowledge of what is sworn to. It is not proper for the secretary or some other officer of a corporation to make affidavit to something that is personally known only to the shipping clerk. There is nothing to be gained by such procedure, and a claimant will be aided in establishing a reputation for reliability, if he takes care that the affidavits required in his case contain only facts that can be substantiated and that are known to the person swearing to them. Fig. 9 is a form of affidavit to be used in connection with claims for shortage. This form may be varied to meet different conditions.

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#### DAMAGE CLAIMS

**37.** The subjects of loss and damage are very closely related in the handling of claims, as appears natural when it is realized how closely the causes of the two kinds of claims may be. For example, a car may be in a train wreck, with the result that part of the contents may be destroyed while another part may be damaged. In other words, the same accident that prevented the carrier from delivering some of the shipment forced it to deliver another part in a damaged condition.

The documents generally required in connection with claims for known damage are the bill of lading, the freight bill, the original or certified copy of the invoice, an itemized bill for the cost of repairs, or other evidence of the amounts expended in connection with the damage.

**38.** A matter of importance in connection with damaged property is that it is the duty of the consignee to accept it, unless it is entirely worthless, and do what he can to reduce the amount of damages for which the carrier will have to pay. There are many ways in which the consignee can help to reduce





39. Where damage is apparent when the carrier delivers the shipment to the consignee, the agent should be asked to note the damage on the freight bill. Where damage is apparent when the delivery is made, but the extent of it cannot be determined until the shipment is unpacked, the agent should be asked to send a representative to see conditions after unpacking. For example, when an article is packed in a crate, it may be possible to see that it is damaged, but the exact extent will be determined only when it is unpacked.

Fig. 10 is a form of affidavit to be used in connection with damage claims.

The forms required in connection with concealed damage are the same as in connection with known damage, except the two forms shown in Figs. 7 and 8, which have already been referred to.

The carriers are equally, if not more, insistent that they shall be given an opportunity to inspect shipments upon which concealed damage is claimed than where concealed loss is involved. For example, it may be apparent that the contents of a case were broken because they were put into the case without the use of sufficient packing material. The use of paper, excelsior, or other packing material is often essential to safety in transportation, and failure to take the necessary precautions may be penalized by refusal to pay the claim.

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#### LOSS AND DAMAGE BY DELAY

40. While most loss and damage claims are due to the failure of carriers to deliver property or to delivering it in a damaged condition, there are those which are designated as claims for loss by delay or damage by delay. Claims for loss by delay are based upon the decreases in prices during the period that a shipment was delayed in transit, while claims for damage by delay are based upon decay, abnormal shrinkage, or other physical causes arising out of delays in delivery. The principal feature in the adjustment of both kinds of claims is the determination of what constitutes "reasonable time" for affecting delivery in the individual case.

While the subject of what constitutes a reasonable time could be completely covered only by a long legal discussion, it may be said in brief that such claims depend upon two factors: (1) The time that is ordinarily required to make delivery of the traffic involved; (2) the valid reasons which the carrier can give to show why delivery was not made in the time ordinarily required. For example, if it ordinarily takes three days for delivery between two points, and six days are consumed in the delivery of a specified shipment, there would be a presumption of unreasonableness in the time consumed. If, however, it is shown that there were unusually heavy snows during this time, it is probable that the carrier would be relieved from liability for delay. The burden of proof is on the carriers to prove that they were not negligent, but they have the advantage of knowing just what caused the delay, while the shipper or consignee probably does not.

**41.** It is very difficult to collect claims due to delay, as the carriers do not ordinarily guarantee to transport shipments on any particular train or boat, or to get goods to destination for a certain market. For example, Section 3 of the Uniform Bill of Lading makes the following provisions:

No carrier is bound to transport said property by any particular train or vessel, or in time for any particular market, or otherwise than with reasonable despatch unless by specific agreement endorsed hereon.

The exception to this, or similar conditions, is generally found in connection with live stock, fruits, vegetables, and other commodities which are of such a nature as to require quick and regular transportation, or which are dealt in in markets held on specified days of the week, or at specified times in the day.

**42.** One reason that makes the carriers slow to accept shipments where they undertake to make delivery under definitely stipulated conditions is that if they make such a guarantee for one shipper they must do it for all who are similarly situated. For example, let it be supposed that a certain shipper at Point A has a machine to ship to Point B, and that

the machine is needed in three days, which is the time generally required to make delivery at that point. If the carrier guarantees delivery in a specified time for that shipper, every other shipper similarly situated could demand a similar guarantee, or have a just cause of complaint of unjust discrimination.

**43.** In case the shipper or consignee feels that he has a valid claim for delay, the following papers should be filed: The bill of lading, the freight bill issued at destination, the original or a certified copy of the invoice, and such other papers as will help to establish the amount of the claim. Where the claim is based upon market prices, it is very essential to file papers, reports or other records to establish definitely what the market price was at a specified time.

**44.** As a precaution when filing claims, it is well, after the papers in the claim have been put together, to make a final review of them to see: (1) If all the essential documents, such as the bill of lading, for example, have been included, (2) whether everything that will help to expedite the settlement of the claim has been included. It sometimes happens that something which is omitted in the preparation of a claim means just the difference between winning and losing the claim. It must be remembered that, once the carriers have declined a claim, it is very difficult to get them to consider it again, especially if the additional facts brought forward were available when the claim was first filed.



# EXPRESS AND PARCEL POST

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## THE EXPRESS SERVICE

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### DESCRIPTION OF SERVICES FURNISHED

**1. Details of the Business.**—Though the statistics of the amount of transportation charges paid or the tons transported would make the express service appear as being of minor importance in the schemes of distribution, it is a fact that the express companies play a very important part, not only in the conduct of business, but in supplying our personal needs, particularly for food and drink.

Express transportation is largely a less-than-carload service, although the handling of carloads is provided for. The movement of less-than-carload shipments by express includes: (1) The collection of the shipment at the shipper's place of business or residence, by the express company's truck, which moves it to the railroad terminal, where it is loaded into a railroad car; (2) the movement of the car by the railroad company, either as a part of a passenger train, or in a train consisting only of express cars; (3) the delivery from the railroad to the consignee by the express company; the movement of carloads by express does not usually include the picking up and delivery of the shipment, and there are many cases where these are not included in the less-than-carload service; (4) personal protection and care of shipments.

Because of their part in the transportation, the railroads receive a considerable portion of the revenue paid to the express companies. The amount so received and other conditions under which the transportation is to be performed are matters of contract between the express companies and the railroads.

The express companies are rated as common carriers by the Interstate Commerce Act, state laws, and the courts. The railroads also are common carriers, but in relation to the express business they are the agents of the express companies.

2. The classes of traffic to which the express service is normally adapted are as follows:

1. Small packages, which on account of their small size would be liable to loss and damage if shipped by freight.

2. Shipments whose value is such as to require a closer protection against loss and damage than is possible in freight transportation.

3. Shipments that are needed in less time than they can be handled by the freight service.

4. Perishable goods, such as fruits, vegetables, and fish.

5. Carload movements of two general classes: (a) Fruits and vegetables from producing points, such as California; (b) animals of various kinds, particularly those of high value, such as race horses.

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### EXPRESS DOCUMENTS AND PUBLICATIONS

3. In general, the publications and regulations relative to the conduct of the express business are much simpler than those for freight transportation. For example, it will be found that rates, particularly class rates, are adjusted in a much simpler and more definite manner than are freight rates. In view of the simplicity of the express publications, portions of these publications are here shown as the most effective method of showing the conditions under which express transportation is performed.

# UNIFORM EXPRESS RECEIPT.

The Company will not pay over \$50, in case of loss, or 50 cents per pound, actual weight, for any shipment in excess of 100 pounds, unless a greater value is declared and charges for such greater value paid.

## EXPRESS COMPANY.

NON-NEGOTIABLE RECEIPT.

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Received from \_\_\_\_\_ subject to the Classifications and

Tariffs in effect on the date hereof, \_\_\_\_\_

to be \_\_\_\_\_, value herein declared by shipper  
dollars.  
(See footnote.)

Consigned to \_\_\_\_\_

at \_\_\_\_\_

Charges, \_\_\_\_\_

Which the Company agrees to carry upon the terms and conditions printed on the back hereof, to which the shipper agrees, and as evidence thereof accepts and signs this receipt.

Shipper. \_\_\_\_\_

For the Company, \_\_\_\_\_

NOTE.—The company's charge, except upon ordinary live stock, is dependent upon the value of the property, as declared or released by the shipper. If the shipper desires to release the value to \$50 for any shipment of 100 pounds or less, or not exceeding fifty cents per pound, actual weight, for any shipment in excess of 100 pounds, the value may be released by inserting "not exceeding \$50," or "not exceeding fifty cents per pound," in which case the company's liability is limited to an amount not exceeding the value so declared or released.

FIG. 1



## CONDITIONS:

① t7 Except where the loss, damage, or injury complained of is due to delay or damage while being loaded or unloaded, or damaged in transit by carelessness or negligence of the carrier, the carrier's liability must be made in writing by the carrier.

of the property or, in case of failure to make delivery, then within four months and fifteen days after date of shipment; and suits for loss damage or delay shall be instituted only within two years and one day after the date when notice in writing is given by the carrier to the claimant that the carrier has disallowed the claim or any part or parts thereof.

8. If any C. O. D. is not paid within thirty days after notice of non-delivery has been mailed to the shipper the company may at its option return the property to the consignor.

9. Free delivery will not be made at points where the company maintains no delivery service; at points where delivery service is maintained free delivery will not be made at addresses beyond the established and published delivery limits.

**Special Additional Provisions as to Shipments Forwarded by Vessel from the United States to Places In Foreign Countries.**

10. If the destination specified in this receipt is a foreign country, the property covered hereby shall, as to transit over ocean routes and by their forwarding, be subject to the same regulations as to all the terms and conditions of the receipts or bills of lading of ocean carriers, to be put on file to compare for the shipment and of foreign carriers participating in the transportation, and the same conditions of transit, transportation and delivery subject to the acts, laws, regulations, and customs of the vessel and foreign ports, customers, and governments, their employees and agents.

11. The company shall not be liable for any loss, damage, or delay to said shipments over ocean routes and their foreign connections the destination of which is not a port of call of the vessel, or for any loss, damage, or delay to said shipments over land routes, including the use of inland waterways, the destination of which is not a port of call of the vessel, or for any loss, damage, or delay to said shipments over air routes, including the use of air carriers, the destination of which is not a port of call of the vessel, or for any loss, damage, or delay to said shipments over any combination of the foregoing modes of transportation. Claims for loss, damage or delay must be made in writing to the carrier at the port of origin of the cargo or to the carrier using such receipt within nine months after delivery of the goods and failure to make such delivery, then within nine months and fifteen days after the date of receipt of the bill of lading, and claims so made against said deliverer or issuing carrier shall be deemed to have been made against any carrier which may be liable hereunto. Unless claims are so made to have been made against any carrier which may be liable hereunto.

12. It is hereby agreed that the property desired to such foreign countries and assignable with the government of such duties, taxes, or other duty to be subject to the same at the time of the same, and charges, when advanced by the company, shall become a lien on the property;

### EXPRESS RECEIPTS

**4. Forms of Express Receipts.**—In the express business instead of the bill of lading, which is the receipt and contract in connection with freight transportation, the Uniform Express Receipt is used. The front and back of this receipt are shown in Fig. 1, from which it will be seen that this receipt indicates several material differences between freight and express transportation.

One essential feature of this receipt is that the shipper who signs the receipt specifically agrees to a limitation of liability, as indicated at the top of Fig. 1, and claims will be adjusted upon the basis of this provision unless definite provision is made to the contrary on the receipt, in the publications of the express companies, or elsewhere.

It is important that all the conditions on the back of the receipt should be carefully noted, but attention is particularly called to Section 7, which deals with a very essential feature of filing claims. The provisions of this section not only can be but *are* enforced. The important difference between them and similar provisions in connection with freight transportation lies in the fact that, while claims for freight that has not been delivered must be made within a specified time after the freight *should have been delivered*, the express receipt specifically mentions that such claims must be filed *within 4 months and 15 days after the date of shipment*. The specific period does away with controversies that often arise as to when the shipment should have been delivered.

While the delivery of property, as already described, is one of the features of the express service, it should be understood that delivery is provided only under specified conditions, as mentioned in Section 9 of the express receipt.

**5.** In addition to the Uniform Express Receipt, there are three other forms of receipt in use in connection with express transportation: (1) The Uniform Contract for Ordinary Live Stock; (2) Uniform Live Stock Contract for the Transportation of Animals Other Than Ordinary Live Stock; (3) Special

Contract for the Transportation of Paintings, Pastels, Pictures, Statuary, and Wax Figures, of a Value of Over \$550. The two first mentioned receipts cover traffic that is always recognized as being subject to special transportation conditions, while the last mentioned form provides for the transportation of articles of unusually high value.

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#### EXPRESS CLASSIFICATIONS

**6. Rules as to Classes.**—Express charges are based upon the classification of property according to its transportation characteristics; and classification regulations are published in the publication of which Fig. 2 is the title page. Accompanying, under the heading of Express Classification Rules, are given some of the rules of the Express Classification, that will be specially referred to.

An essential difference between the Express Classification and the Consolidated Freight Classification will be seen by referring to Section (a) of Rule 1 of the Express Classification Rules. It will be noted that by this rule, first-class rates apply unless other provision is made, which is the reverse of the case in freight classification, where an article that is not specifically provided for takes the same rate as the one to which it is similar from a transportation standpoint. Instead of the many classes used in freight classification, express has only three classes, with provision made for the use of multiple and fractional classes related to the first class as explained in Rule 1.

#### EXPRESS CLASSIFICATION RULES

##### 1. Application of Rates and Charges:

(a.) **First-class rates** are applicable to all property received for transportation by the Companies parties to this Classification, unless otherwise hereinafter provided.

(b.) If a shipment is rated first class the charge shall be ascertained by reference to "Local and Joint Schedule of First and Second-Class Express Rates" lawfully on file with the Interstate Commerce Commission, the Canadian Railway Commission and the Public Service, Public Utilities and Railroad Commissions with which this Classification is filed.

Calif. P. U. C. No. 24.  
 Canada Colo. P. U. C. No. 2.  
 Conn. No. 4.  
 Canada Conn. No. 3.  
 Del. No. 4.  
 D. C. No. 7.  
 Ky. R. C. No. 18.  
 Canada Ky. R. C. No. 3.  
 P. U. C. Me. No. 67.  
 Canada P. U. C. Me. No. 2.

P. S. C. Md. No. 24.  
 Canada P. S. C. No. 3.  
 Mass. P. S. C. No. 28.  
 Canada Mass. P. S. C. No. 2.  
 Mich. P. U. C. No. 47.  
 Canada Minn. P. U. C. No. 3.  
 N. H. P. S. C. No. 23.  
 Canada N. H. P. S. C. No. 3.  
 N. J. No. 18.  
 Canada N. J. No. 3.

N. M. C. C. No. 51.  
 Canada N. M. C. C. No. 3.  
 P. S. C. — 1 N. Y. — No. 11.  
 Canada P. S. C. — 1 N. Y. — No. 2.  
 P. S. C. — 2 N. Y. — No. A-47.  
 Canada P. S. C. — 2 N. Y. — No. A-9.  
 Ohio No. 23.  
 Canada Ohio No. 3.  
 Ore. P. S. C. No. 46.  
 Canada Ore. P. S. C. No. 3.

P. S. C. Pa. No. 42.  
 Canada P. S. C. Pa. No. 3.  
 R. I. P. U. C. No. 14.  
 Canada R. I. P. U. C. No. 3.  
 Vt. P. S. C. No. 29.  
 Canada Vt. P. S. C. No. 3.  
 Wyo. P. S. C. No. 37.  
 Canada Wyo. P. S. C. No. 1.

I. C. C. No. 1500.  
 Canada I. C. C. No. 169.

C. R. C. No. 1139.  
 Canada C. R. C. No. 121.

Only two Supplements to this Classification  
 will be in effect at any time.

# American Railway Express Company

In connection with

Canadian Express Company .....	EX 5—No. 2.	P. A. No. 2
Canadian National Express Company .....	EX 5—No. 1.	P. A. No. 1
Dominion Express Company .....	EX 5—No. 18.	P. A. No. 3
Newfoundland Express Company .....	EX 5—No. 2.	P. A. No. 2

## OFFICIAL

# Express Classification

## No. 27

Applying on Express Traffic covered by Tariffs issued subject thereto.

ISSUED DECEMBER 15, 1920.

EFFECTIVE FEBRUARY 4, 1921,

except as noted in individual items.

Date received.....1920.

D. S. ELLIOTT,  
 Vice-President,  
 New York, N. Y.

Issued by  
 GEO. S. LEE,  
 Traffic Manager,  
 51 Broadway, New York, N. Y.

FIG. 2

(c.)  $\frac{1}{2}$  of 1. On shipments classified at one-half first class, the charge shall be one-half of the charge at the First-class rate, unless otherwise provided in individual items.

(d.) On a shipment classified at higher than first-class rate the charge at the First-class rate must be multiplied by the number indicating the higher classification. If classified at " $1\frac{1}{2}$  t 1," multiply the charge at First-class rate by  $1\frac{1}{2}$ ; if classified at " $2$  t 1," multiply the charge at First-class rate by 2, etc.

(e.) **Second-class rates** are applicable to commodities herein classified as second class and to all articles of Food and Drink except as hereinafter otherwise provided. (See Rule 17.)

(f.) If a shipment is rated second class the charge shall be ascertained by reference to "Local and Joint Schedule of First and Second-Class Express Rates" lawfully on file with the Interstate Commerce Commission, the Canadian Railway Commission and the Public Service, Public Utilities and Railroad Commissions with which this Classification is filed.

(g.) Shipments entitled to Second-class rates, when so packed as to conceal their nature, must be marked with their correct designations. If not so marked the shipment will be billed at First-class rates, subject to revision upon subsequent disclosure or proof of the actual contents.

(h.) Unless otherwise provided, charges on Second-class matter must be based upon the gross weight of the shipment at the time it is received for transportation, provided, however, that when it is necessary to use ice for preservation, and it is used for that purpose only, an allowance of 25 per cent. from the gross weight will be made from March to November, inclusive, and an allowance of 15 per cent. from gross weight will be made from December to February, inclusive, but the weight so ascertained must not be less than the gross weight of the shipment without the ice. (See also Rules 10 and 11 concerning weights.)

(i.) Two or more packages of Second-class matter from the same shipper at the same time to the same consignee shall be aggregated and charged for upon the aggregated weight.

(j.) **Third-class rates** are applicable to commodities herein classified as third class and are 1 cent for each 2 ounces or fraction thereof, minimum charge 15 cents, but the charge at Third-class rates must not be more than the charge at First-class rates.

Each package should have the name of the article or articles contained therein written, stamped or printed thereon.

The true value, which must not exceed \$10.00, or the notation "Value Not Exceeding \$10.00" must be placed on the package by the shipper and entered on the receipt.

(k.) **Pound rates.** This term is used to indicate that the charge for

a package of 100 pounds is to be multiplied by the number of pounds in the shipment and the product so obtained divided by 100. The result will be the charge.

**Example:** Charges on a shipment weighing 75 pounds between points taking Scale No. 8 (\$1.25 for 100 pounds) on which Pound rates apply would be ascertained by multiplying  $125 \times 75$  and dividing the product by 100 = 93.75 cents or 94 cents.

(l.) When the net weight is a necessary factor in computing the charge upon any commodity, shippers must mark the net weight upon the package; when not so marked by shipper, such packages must be charged for upon the gross weight at time of shipment.

(m.) **Fractions.** In computing charges, whenever fractions occur, either in the aggregate weight or charges, the next higher whole number must be used.

(n.) Any package containing articles of more than one class must be charged the rate applicable to the highest classed article contained therein unless specially provided to the contrary.

## 2. Receiving Shipments:

(a.) The shipper must be requested to place his name and address on ALL packages, except in carload lots, and in the event of his refusal to do so, charges must be prepaid.

(b.) A receipt of the form prescribed herein must be given for all matter received. The value of the property must be declared by the shipper, and inserted in the receipt. The shipper's declaration of such value may be made by inserting "not exceeding \$50.00," or "not exceeding 50 cents per pound, actual weight," as the case may be, in the blank space in that portion of the receipt reading "value herein declared by shipper to be \$....."

(c.) Shipments destined to points in the United States and adjacent Foreign Countries must not be accepted when consigned "To order of," or "To Notify" a bank, or any person.

(d.) Uniform express receipts are not negotiable and shipments must not be accepted, the delivery of which is conditioned upon surrender of the original receipt at time of delivery.

(e.) When consigned to a place at which the Express Company has no office, shipments must be marked with the name of the express station at which delivery will be accepted, or be marked with forwarding directions if to go beyond the Express Company's Line by a carrier other than an Express Company. If not so marked, shipments will be refused.

(f.) Shipments of jewelry, diamonds, or other precious stones, money, bullion, bonds, coupons, watches or valuable papers will not be accepted for shipment in packages containing ordinary merchandise unless such articles are described in the uniform express receipt, as shipments of this character are transported by the Express



Company only through a special department. In case of loss of any of the articles above mentioned when shipped with other merchandise the Express Company will not be liable except for its own negligence unless such articles are described in the uniform express receipt.

(g.) Shipments consigned to an individual or firm at one express office, and marked in care of an individual or firm at some other express office, must not be accepted.

\* \* \* \* \*

### 13. Valuation Charges:

(a.) Rates named in tariffs governed by this Classification, except as to ordinary live stock, are dependent upon and vary with the declared or released value of the property, and, except as to live stock chiefly valuable for breeding, racing, show purposes, or other special uses, other live animals named and not named herein, live birds, live pigeons, live poultry, and reptiles, are based upon property declared to be of, or released to, a value not exceeding \$50 for any shipment of 100 pounds or less, or not exceeding 50 cents per pound actual weight for any shipment in excess of 100 pounds: When the declared or released value exceeds that above stated (except as to paintings, pastels, pictures, statuary, and wax figures) the rates are 10 cents greater for each \$100 or fraction thereof in excess of the value stated above.

(b.) Paintings, pastels, pictures, statuary and wax figures:

1. When the declared or released value of any shipment does not exceed \$550, the rates are 10 cents greater for each \$100 or fraction thereof in excess of \$50 on shipments weighing 100 pounds or less, or 50 cents per pound on shipments weighing more than 100 pounds.

2. When the declared or released value of any shipment weighing 1,100 pounds or less exceeds \$550, the rates for the portion of such value up to \$550 are 10 cents greater for each \$100 or fraction thereof in excess of \$50 on shipments weighing 100 pounds or less, or 50 cents per pound on shipments weighing more than 100 pounds. The rates for the portion of such value in excess of \$550 will be greater for each \$100 or fraction thereof as shown in Paragraph 4.

3. When the declared or released value of any shipment weighing more than 1,100 pounds exceeds \$550, the rates will be greater for each \$100 or fraction thereof of such value in excess of 50 cents per pound actual weight as shown in Paragraph 4.

7. While first and second-class express rates vary with the distance of movement, it will be noted by reference to Section (j) of Rule 1 that the third-class rate is based only upon the weight of the shipment. A study of the Classification will



show that the third-class rate is applicable upon certain kinds of printed matter, the class having been established to compete with rates established by the United States Post Office Department. A feature of second- and third-class rates is the fact that unless shipments are marked in accordance with the provisions of the rules governing they will be charged for on a higher classification.

8. That the provisions of the Express Classification are not intended to apply to certain kinds of articles of unusual value is shown by Section (f) of Rule 2. Provisions for the transportation of many articles of this class are carried in the Money Classification, to which reference will be made later on. It is important to note the danger of mixing such articles with ordinary traffic and the still greater danger of failing to indicate clearly on the package what is included in the shipment.

**9. Relation of Value to Rate.**—The express receipt shown in Fig. 1 makes specific provision for a liability limited to a stated amount, and Rule 13 (a) makes provision for the construction of rates when it is desired to hold the express company responsible for a value greater than the limited released valuation provided for in the receipt. For example, suppose it is desired to make a shipment weighing not more than 100 pounds and to declare a valuation of \$100 on it.

If the rate where the conditions of the receipt are accepted is \$1.00, then the rate at the \$100 valuation would be \$1.10, because the rule provides for an additional charge of 10 cents for each \$100 or fraction thereof in excess of \$50.

Another example is presented by a shipment weighing 300 pounds on which a value of \$300 is declared, and which is to be shipped to a point to which the released rate is \$5.

According to Rule 13 (a), at the released rate the express company is liable up to 50 cents a pound. The value of 300 pounds at 50 cents a pound would be \$150, and the excess of the actual value over this amount is \$150, which at a charge of 10 cents per \$100 or fraction thereof would be 20 cents additional. Therefore the rate at the declared valuation would be \$5.20.

Instead of declaring the value and paying the extra rate on shipments of high valuation, many shippers find it cheaper to ship released and take out insurance to protect themselves from loss.

**10. Express Carloads.**—Since carload shipments are not the routine traffic in express transportation, it is natural to find that more specific provisions have to be made for handling them than in freight transportation, where the carload is the prevailing unit in many kinds of traffic. The regulations relating to this point are found in Rule 16, part of which is as follows:

**16. Carload or Bulky Shipments, Not Including Live Animals or Live Stock:**

(a.) Property classified herein as first-class or higher, which by reason of its bulk, length, or weight, cannot be loaded or carried in the ordinary express car, and for which a special car must be provided, or heavy castings or other shipments of unusual size or weight, originating at or destined to way stations, even though they could be loaded in the ordinary express car, must not be accepted for shipment until the dimensions, the weight and a complete description of the property have been reported to the Superintendent and arrangements have been made by him for handling and forwarding the shipment through to destination, if such arrangements can be made.

(b.) When the transportation of a shipment described in Paragraph (a) of this rule requires the use of an exclusive or special car, application for same must be made by the shipper in writing, and when such exclusive or special car is furnished the minimum charge on the shipment must be the charge on 12,000 lbs., at First-Class rate; if the shipment consists of articles or commodities that, under the Classification, are subject to higher than First-Class rate, and the gross weight is less than 12,000 lbs., the charge must not be more than the charge for 12,000 lbs. at the First-Class rate; if weighing 12,000 lbs. or more, the charge shall be for the actual gross weight at First-Class rate.

(c.) If a shipper makes written request for an exclusive or special car for a shipment of second-class matter, and such car is furnished by the Express Company, the charge will be based on the actual or authorized estimated weight, minimum 12,000 lbs.

(d.) The charge on less than carload shipment carried in regular express car must not be greater than the charge on a carload shipment in a special car.

(e.) Carload Shipments for Race Tracks, Exposition Grounds, Fair Grounds or Sidings, are subject to such Switching or Terminal Charge as may be provided in the "Terminal and Switching Charge Tariff" of the delivering company lawfully on file with the Interstate Commerce Commission, the Canadian Railway Commission and the Public Service, Public Utilities and Railroad Commissions with which this Classification is filed. Such shipments must be receipted for as destined to the ultimate destination and so waybilled, only when Agent at shipping point has been furnished with a specific rate to such Race Track, Exposition or Fair Grounds or Siding. In the absence of a specific rate, the shipment must be receipted for as destined to the Express Company's nearest office for which rates are given and waybilled accordingly.

\* \* \* \* \*

(r.) **Detention of Cars**—1. Cars containing carload shipments moving under rates which do not include delivery service and which are held for or by consignee for unloading, reconsignment, diversion or for any other purpose will be subject to the following charges per car per day, or fraction of a day, after expiration of 48 hours from the time car is available for unloading until car is released:

For each of the first two days..... \$10.00  
For each succeeding day..... 15.00

2. In computing time, Sundays and Legal Holidays (National, State and Municipal) but not half holidays, will be excluded. When a Legal Holiday falls on Sunday, the following Monday will be excluded.

3. Notice of arrival shall be sent or given consignee, or party entitled to receive same, by the Express Company's Agent in writing or, in lieu thereof, as otherwise agreed to in writing by the Express Company and consignee, within twenty-four hours after arrival of car and billing at destination, such notice to contain car initials and number, point of shipment, contents and if transferred in transit, the initials and number of original car.

4. When, because of severe storms, high water, or snowdrifts, it is impossible during any part of the prescribed free time to get to the cars for unloading, and (or) when, because of temperature, it is impossible to unload cars without serious injury to contents, the free time will be extended until a total of forty-eight hours free from such interference shall have been allowed. A consignee shall not be absolved from penalty charge if, considering the character of the freight others similarly situated, and under the same conditions, reasonably could and did unload cars during the same period of time.

5. When, as the result of the act or neglect of any Express Company, cars destined for one consignee, at one point, are bunched at originating point, in transit, or at destination, and delivered to the

consignee in accumulated numbers in excess of daily shipments, the consignee shall be allowed such free time as he would have been entitled to had the cars been delivered in accordance with the daily rate of shipment.

6. On cars held for unloading, time will be computed from the first 7:00 A. M. after placement on delivery tracks, and after the day on which notice of arrival is sent or given to consignee or party entitled to receive same. If car is not placed within 24 hours after notice of arrival has been sent or given, time will be computed from the first 7:00 A. M. after the day on which notice of placement has been sent or given to the consignee or party entitled to receive same.

7. On cars held for orders or payment of charges, whether such cars have been placed in position to unload or not, time will be computed from the first 7:00 A. M. after the day on which notice of arrival is sent or given to the consignee or party entitled to receive same.

In Rule 16, it will be noted that carload shipments have to be handled by giving notice and making special arrangements. It will also be seen that few if any concessions are made in the way of lower rates on carloads than on less than carloads, except where the contents of the car take a higher than first-class rate.

Rule 16 goes into considerable detail relative to the handling of carload shipments, but only the more important sections have been here reproduced. It will be seen that Section (*r*) refers to demurrage, and special attention is called to the amount assessed for the retention of cars beyond the specified free time.

**11. References.**—Fig. 3 is a page from the Express Classification showing the wide variety of traffic handled and typical regulations. A feature of the Express Classification, which is often very helpful, is the practice of referring to other parts of the classification where some desired information will be found, as in the case of Item 4, where reference is made to Animals, Live, for the classification of ferrets.

**12. Return of Empties.**—One of the valuable services performed by the express companies is the return of empty carriers, such as those used for bakery products, fruits, flowers, etc. The conditions under which carriers will be returned are shown in Rule 24, which is as follows:

F	Class	F	Class
1 Feathers: Closely compressed in bales..... 1 N O. S. .... 1½ t 1		19 Forms, Dress. (See Dress Forms.)	
2 Feathers, Millinery. (See Millinery.)		20 Frames, Vehicle. (See Vehicles.)	
3 Fenders. (See Vehicles.)		21 Frog Boxes or Crates (returned). (See Empties.)	
4 Ferrets. (See Animals, Live.)		22 Eggs, Live. (See Animals.)	
5 Fertilizer and Fertilizer Material, dry and deodorized	2	23 Fruit, Green: Including Green Fruit in wooden or slatted covered baskets, also in baskets covered with corrugated or fibreboard covers not less than .060 of an inch thick and having a resistance of not less than 65 pounds to the square inch, Mullen Test, secured by gluing or pasting to the basket at the ends.... Green, in gauze, cloth, or paper-covered baskets, subject to Rule 1 (a)..... When without cover, will not be accepted.	2 1
6 Figures, Papier Mache. (See Papier Mache, Figures.)		24 (a) +In order to facilitate handling, fruit in packages weighing less than 10 pounds each, shipped in lots of ten or more packages from one shipper to one consignee, must be crated or securely fastened together in bundles, each bundle to consist of not less than four nor more than ten packages.	
6½ Fibre Cord. (See Paper)		25 Fruit Empties (returned). (See Empties.)	
7 Films, Moving Picture. (See Moving Picture Films.)		26 Fruit, Preserved, in Glass: Subject to Rule 18.....	2
8 Fire-arms, i. e., Muskets, Rifles, Shot-Guns, Pistols, or Revolvers: Employees must satisfy themselves that fire-arms not packed are not loaded before accepting them for shipment. Boxed, crated, trussed, or taken apart and packed in sole leather cases..... Not so packed..... Toy Guns, securely packed.....	1 2 t 1 1	27 Funeral Supplies, Routing of. (See Corpses.)	
9 Fire Brick. (See Castings.)		28 Furniture. (Subject to Rule 18.) Charges on all Second-hand Furniture must be prepaid	
10 Fish Eggs, Hatching.....	1	29 Bed Springs, Bed Slats (tied together) and Bed Sides (properly protected).....	1
11 Fish, Fresh, Frozen, Smoked, Dried, Salted, Pickled or Otherwise Preserved or Cured..... Must be charged for on basis of gross weight, except that Fresh or Frozen Fish, shipped with ice, which is necessary for its preservation, must be charged for on the basis of 25 per cent. added to the net weight of the Fish, unless actual gross weight is less at time of shipment.	2	30 Bedsteads, Iron, K. D. or Parts thereof—The enamel work protected by a wrapping of either paper or burlap, not boxed or crated.....	1
12 (a) +Fish, Live, Aquarium or Breeding—At gross weight of Fish, cans and water, charges must be prepaid or guaranteed.....	1	31 Book Cases—Sectional, K. D. flat, and boxed or securely crated..... N. O. S., same as Furniture N. O. S.	1
13 Fish, Live, in tanks or cans containing water, not including Aquarium or Breeding Fish: In less than carloads, gross weight less 25 per cent. In carloads in Special Live Fish Cars. Charge on the basis of the net weight of Fish, minimum 12,000 lbs. per car..... Shippers must furnish the Express Company with certified copy of invoice, or statement showing the net weight of the Fish loaded in each car. The above carload rating is conditioned upon the shipper furnishing the necessary cars at his own expense. Upon request of the shipper the Express Company will undertake as far as practicable to procure cars from the Railroad Company, for which cars the Railroad Company will make a rental charge of \$2.00 per day for 30 days of each year (except when cars are in shop for necessary repairs), payable monthly in advance, at the rate of \$20.83 per month; also an additional rental charge of 25 cents per mile (to accrue to the owner of the car) for the movement of the empty car, which empty movement will be covered by express waybill. These charges will be collected by the Express Company. Where ice is furnished in connection with these carload shipments, an additional charge to cover the cost of ice will be made by the Express Company. One male attendant will be carried free with each full carload.	2 2	32 Chairs, Folding, Steamer, Camp or Opera.....	1
14 Flour Sacks, Cloth or Paper. (See Empties.)		33 Chairs, Invalid Wheel: Boxed or crated..... Not boxed or crated.....	1 2 t 1
15 Flower Baskets, Boxes or Crates (returned) (See Empties)		34 Chairs—Iron frame.....	1
16 Flowers for Funerals, Routing of. (See Corpses.)		35 Chairs, Kindergarten.....	1
17 Flying Machines. (See Aeroplanes.)		36 Chairs N. O. S.—Same as Furniture N. O. S.	
18 Food, Articles of, N. O. S..... (See Rule 1.)	2	37 Chairs, Rustic, including Settees—Same as Furniture N. O. S.	
		38 Cots, Folding.....	1
		39 Furniture Frames—Set up, same as Furniture N. O. S.	
		40 Letter File Cases—Same as Furniture N. O. S.	
		41 Refrigerators, when new, must be boxed or crated..	1
		42 School Desks.....	1
		43 Shoe Racks—Same as Furniture N. O. S.	
		44 Stools, Iron Frames.....	1
		45 Stools, Organ or Piano: Boxed or crated..... +Not boxed or crated.....	1 1½ t 1
		46 Tables, Caterers' K. D. or Folding.....	
		47 Furniture N. O. S.—Second Hand, must be boxed or crated, and charges must be prepaid, minimum charge first class under Scale 10.....	1

Effective on Interstate Traffic January 10, 1921. Issued on five (5) days' notice under authority of the Interstate Commerce Commission's Opinion, dated November 5, 1920, in Docket No. 11416. Effective on Intrastate Traffic as indicated on page 2.  
+Denotes charges other than reductions or increases.

FIG. 3

#### 24. Empty Carriers, Returned:

**Charges must be prepaid** unless an agreement has been made with the owner of the Carriers whereby they may be returned with charges "to collect."

The charges given hereinafter, unless otherwise provided, cover the transportation of Returned Empty Carriers which were shipped when full over the lines of the Company or Companies by which they are returned, and apply only to Empty Carriers returned from original destination, or, when reshipped, from final destination to the point from which the filled carriers were originally shipped. The charges defined include wagon service within established delivery limits at points where such service is maintained, unless otherwise provided.

When necessary to expedite the movement of Returned Empty Carriers, they may be returned at the rates named herein by freight train at the option of the Express Company.

Returned Empty Carriers, not specifically named below, will be charged one-half the rate per 100 pounds that applies on the commodity shipped in the Carriers when full (Pound rates), but the rate per 100 lbs. applied must not be more than one-half the First-Class rate; minimum charge 16 cents per shipment. The weights of two or more of such Empty Carriers from the same consignee must be aggregated and charged for upon the actual gross weight of the shipment; the weights of Empty Carriers from different shippers must not be aggregated.

The charges on Returned Empty Carriers, as shown herein, will not apply to Trunks or other Packages which are locked or fastened so that it is impossible to ascertain if the packages are empty. Carriers so locked or fastened must be charged First-Class rate.

Fig. 4 is a page from the Classification showing some of the great variety of empties that are returned.

It will be noted in Rule 24 that the charges made for returning empties are very small, so that by complying with the conditions laid down for handling these articles, it will often be possible to reduce transportation expenses by reducing the cost of containers. One means of doing this may be to use better containers, even at a higher price, since they may represent a net saving because they can be used several times, as against those that will make only one trip.

As the successful handling of many commodities, including those which move in containers that can be returned to the shippers, is often dependent upon the speed and regularity



## E

## Class

## Empty Carriers, Returned—Continued.

- 1 Banana Carriers—Of 1-bunch capacity.....each. 11c.
- 2 ①+Baskets—Laundry or Clothing.....each 15c.
- 3 ①+Bread and Cake Empties.....each. 10c.
- 4 ①+Butter Empties:  
Not exceeding 20 lbs. each.....each 15c.  
Exceeding 20 lbs. each.....each 20c.  
Air Tight Jersey (6 in crate) . . . per crate 20c.  
Refrigerators . . . each 20c.
- 5 ①+Cans—Which contained alcohol, fish, oils, or var-  
nishes . . . each 20c.
- 6 ①+Celery Empties . . . each 15c.
- 7 ①+Cheese Boxes:  
Not exceeding 20 lbs. each.....each 15c.  
Exceeding 20 lbs. each.....each 20c.
- 8 ①+Coops, N. O. S.:  
Not exceeding 50 lbs. each.....each 20c.  
Exceeding 50 lbs. each.....each 25c.  
Coops, Folding, K. D.....each 15c.
- 9 ①+Crab Empties:  
Weighing 40 lbs. or less.....each. 15c.  
Weighing over 40 lbs.....each. 35c.
- 10 ①+Cream and Milk Empties:  
Cans . . . each. 15c.  
Cans containing empty glass test tubes . . . each. 35c.  
Cases or Tubs containing empty jars, bottles or  
cans:  
Not exceeding 50 lbs.....each. 20c.  
Exceeding 50 lbs.....each. 35c.  
Empty Cans returned by the Company which  
carried them when full must be receipted for  
and, when delivered at the depot by the shipper  
and taken from the depot by the consignee,  
must be returned free.
- 11 ①+Demijohns—In boxes or kegs....per box or keg. 20c.
- 12 ①+Egg Cases.....each. 15c.
- 13 ①+Flower Baskets, Boxes or Crates:  
Weighing 15 lbs. or less.....each. 15c.  
Weighing over 15 lbs.....each. 20c.  
Refrigerator Boxes.....each. 35c.
- 14 ①+Frog Boxes or Crates:  
Not exceeding 50 lbs. each.....each. 20c.  
Exceeding 50 lbs. each.....each. 25c.  
Coops, Folding, K. D.....each. 15c.
- 15 ①+Fruit and Vegetable Empties N. O. S.:  
Not Refrigerators:  
Capacity 36 quarts or less.....each. 15c.  
Capacity more than 36 quarts.....each. 20c.  
Refrigerators:  
Capacity under 64 quarts.....each. 35c.  
Capacity 64 quarts and over.....each. 70c.
- 16 ①+Hampers—Laundry or Clothing.....each 35c.
- 17 Ice Cream Empties:  
Not exceeding 5-gallon capacity.....each 10c.  
Exceeding 5-gallon capacity.....each 25c.
- 18 ①+Jugs—In boxes or kegs.....per box or keg. 20c.
- 19 ①+Magazine or Newspaper Sacks or Bags.....each 1
- 20 ①+Meat Empties:  
Boxes or Baskets.....each. 15c.  
Refrigerators, not exceeding 75 lbs.....each. 35c.  
Refrigerators, exceeding 75 lbs . . . each. 70c.

## E

## Class

## Empty Carriers, Returned—Continued.

- 21 ①+Oyster and Scallop Empties:  
Not over 5-gallon capacity.....each. 15c.  
Over 5-gallon capacity and not over 10-gallon ca-  
pacity . . . each. 20c.  
Over 10-gallon capacity . . . each. 35c.  
Cases containing empty jars or bottles.....each. 20c.  
Cases without the empty jars or bottles.....each. 15c.
- 22 ●Silk or Yarn Empties:  
Boxes, crates or trunks in which silk or yarn,  
wound on spools or beams, has been shipped  
by express, returned with the empty spools or  
beams thereon (subject to Item 24, page 32),  
minimum 25 cents per shipment..... 1/2 of 1

## 23 Engineering Instruments. (See Surveyors' Instruments.)

## 24 Engines, Chemical. (See Chemical Engines.)

## 25 Estimated Weights:

When in packages described below charge on basis of the  
following estimated weights.

## FROM ALL POINTS.

- 26 Oranges and Grape Fruit. Wt. per lb.  
Box 12 x 12 x 27 inches . . . 80 lbs.  
One-half box 6 x 12 x 27 inches . . . 40 lbs.  
Quarter box 6 x 12 x 12 inches . . . 20 lbs.

27 FROM OFFICES IN ALABAMA, LOUISIANA AND  
MISSISSIPPI.

- Plants, Cabbage.* Wt. per lb.  
In crates 8 x 16 x 26 inches . . . 50 lbs.  
In crates 8 x 14 x 16 inches . . . 25 lbs.  
In crates 8 x 9 x 12 inches . . . 12 1/2 lbs.

28 FRUIT AND VEGETABLES FROM OFFICES IN  
ARIZONA AND CALIFORNIA.

The dimensions of the packages described below are  
exterior measurements for length and interior measure-  
ments for width and depth:

The estimated weights shown in this item will be used  
only when shipments are made without ice. When ice is  
used, add 25 per cent. to the weights named.

COMMODITY	PACKAGE	Dimensions in Inches			Esti- mated Weight
		Depth	Width	Length	
Apples.	Single crate . . . . .	6	16	17 1/2	26 lbs.
Artichokes.	Standard half drum . . . . .	12	12	24	20 "
Artichokes.	Standard whole drum . . . . .	12	12	24	110 "
Asparagus.	Crate, containing 12 2-lb. bunches . . . . .	12	12	24	25 "
Asparagus.	Crate, containing 12 2-lb. bunches . . . . .	12	12	24	34 "
Brussels Sprouts.	Standard whole drum . . . . .	16	24	60	135 "
Brussels Sprouts.	Standard half drum . . . . .	12	12	24	60 "
Capitoloupes.	Crate, pony . . . . .	12	12	24	57 "
Capitoloupes.	Crate, standard . . . . .	13	15	24	68 "
Capitoloupes.	Crate, jumbo . . . . .	14	14	24	78 "
Capitoloupes.	Jumbo flat . . . . .	13	13	24	28 "
Capitoloupes.	Standard flat . . . . .	13	13	24	26 "
Capitoloupes.	Pony flat . . . . .	13	12 1/2	24	25 "
Cherries.	Box . . . . .	9	9	19 1/2	11 "
Grapes.	Single crate . . . . .	7	16	17	28 "
Grapes.	Double crate . . . . .	11 1/2	16	17	56 "
Grape Fruit.	Box . . . . .	11 1/2	11 1/2	24	68 "
Grape Fruit.	Half box . . . . .	7	11 1/2	24	36 "
Lemons.	Box . . . . .	10	13	25	84 "
Nectarines.	Single crate . . . . .	5	15	17 1/2	25 "
Oranges.	Box . . . . .	11 1/2	11 1/2	24	78 "
Oranges.	Half box . . . . .	7	11 1/2	24	39 "
Pears.	Standard whole drum . . . . .	16	24	60	75 "
Pears.	Standard half drum . . . . .	12	12	24	199 "
Peaches.	Box . . . . .	9	11 1/2	19 1/2	50 "
Pears.	Box . . . . .	9	11 1/2	19 1/2	50 "
Pine Apples.	Single crate . . . . .	5	16	17 1/2	26 "
Pine Apples.	Single crate . . . . .	5	16	17 1/2	26 "
Rhubarb.	Box . . . . .	11	11	22	40 "

① Effective on Interstate Traffic January 10, 1921. Issued on five (5) days' notice under authority of the Interstate Commerce Commission's Opinion,  
dated November 5, 1920, in Docket No. 11416. Effective on Intrastate Traffic as indicated on page 2.

● Denotes reductions.

+ Denotes increase.

FIG. 4



with which the commodities can be moved, it is important to remember that the express companies will gladly give information as to service they are furnishing or can furnish. If the local representatives of the express companies cannot give the desired information, it may be obtained from officials such as those named at the bottom of Fig. 2.

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#### EXPRESS TARIFFS

**13. Class Tariffs and Rates.**—After the use of the Express Classification is understood, the next question that arises is how to find the rates to apply in connection with the Classification. The Interstate Commerce Commission has provided a very complete, and at the same time a very simple method of publishing class rates for express. The foundation of the system is the division of the United States into 950 blocks, which are uniform in length but which vary somewhat in width. These blocks are numbered consecutively; but as there are no express stations in over 100 of these blocks, the rates are actually applicable in connection with a little over 800 blocks. Each of the blocks is divided into 16 subblocks lettered A to Q, the letter J not being used. The Commission recognized the varying transportation conditions in different parts of the country by dividing the country into five zones, which are numbered I to V, inclusive. Zone I coincides very closely with Official Classification Territory as defined in connection with freight rates; Zone II covers the southeastern part of the country, corresponding to Southern Classification Territory in freight-rate adjustment; and Zones III, IV, and V cover the rest of the country. Zone IV includes what is known as Inter-Mountain Territory in the western part of the country, where the cost of railroad operation is high and where the transportation rates are accordingly high.

The blocks are numbered by units eastward from the north-western part of the country and by hundreds southward. Thus, Block 102 is directly east of Block 101, while Block 201 is south of Block 101. The methods just outlined have proved highly satisfactory to all concerned and it has not been neces-

sary to make any changes in the general plan since it was first put into effect, although changes in the rates have been necessary to meet changing conditions.

**14.** How the method of rate construction just described has been put into effect in the publications of the express companies can best be illustrated by taking the necessary steps to ascertain the charges on a typical shipment. For this purpose, suppose that it is desired to find the charges on 100 pounds of organ stools, boxed, moving from New York City to Denver, Colorado.

The first step in ascertaining the charges on an express shipment is to find in what blocks (and subblocks if points of origin and of destination are near together) the points of origin and destination are located. This is done by referring to the Joint Directory of Express Stations, of which Fig. 5 is a page on which New York is listed, and Fig. 6 is a page which lists Denver. In Fig. 5 New York is shown to be located in Block 952, subblock A, while reference to Fig. 6 shows that Denver is located in Block 1021, subblock E. The reference mark (d) which follows the name of New York and of Denver signifies that the express companies provide for the pick-up and delivery of shipments by their trucks in those cities. Complete information in regard to deliveries is shown in publications of which Fig. 7 is a typical page.

**15.** The problem has now resolved itself into finding the rate from Block 952 to Block 1021, the subblocks being of no importance, since the points are not near each other. The next step is to find the Scale Number applicable between these blocks, which is done by referring to a tariff which is thus described on its title page: Local and Joint Block Tariff Containing Express Rate Tables from Block 952, from which Fig. 8 is a page. Reference to the column headed 1000 in Fig. 8 shows the number 107 beside Block 1021, which means that Scale 107 governs between Block 952 and Block 1021.

For short-distance traffic the blocks referred to are divided into subblocks so that the finding of a scale in such a case involves the use of subblocks designated by letter, as shown in

# NEW YORK

Supt's Div'n No.	OFFICE	Block No. and Sub-Block Letter	State No.	Supt's Div'n No.	OFFICE	Block No. and Sub-Block Letter	State No.
1	New Dorp . . . . . (Waybill to St. George, N. Y.)	951 H		4	Oakland, Sullivan Co.	871 F	
2	Newfane . . . . .	647 K		2	Oaks Corners . . . . .	718 D	
7	New Hartford . . . . .	749 K		7	Oakwood, Cayuga Co.	749 B	
3	New Hamburg (d) . . . . .	552 I		1	Oakwood Heights . . . . .	951 H	
28	New Hampton . . . . .	871 I		7	O . . . . .	719 I	
4	New Hartford . . . . .	600 F		3	Ogdensburg (d) . . . . .	550 G	
3	New Haven . . . . .	619 L		2	Oleott (Oleott Beach) . . . . .	617 K	
107	New Hyde Park . . . . .	652 I		11	Old Chatham . . . . .	752 K	
11	New Lebanon . . . . .	752 I		6	Olean (d) . . . . .	747 P	
28	New Milford . . . . .	851 I		7	Onativia . . . . .	749 D	
4	New Paltz (d) . . . . .	851 H		10	Oneonta . . . . .	952 A	
2	Newport (d) . . . . .	650 Q		3	Oncida (d) . . . . .	650 O	
19	New Rochelle (d) . . . . .	652 A		4	Oneonta (d) . . . . .	750 M	
4	New Scotland . . . . .	752 E		2	Ontario . . . . .	618 F	
3	Newton Falls . . . . .	551 N		2	O . . . . .	750 A	
3	Newton Hook . . . . .	752 I		4	Orangeburg . . . . .	852 N	
28	New Windsor (d) . . . . .	751 M		3	Orange Farm . . . . .	851 L	
7	New Woodstock . . . . .	750 A		2	Orchard Park . . . . .	747 A	
1	New York . . . . .	952 A		3	Oriskany . . . . .	650 F	
8	Niagara Falls . . . . .	646 Q		4	Oriskany Falls (d) . . . . .	750 C	
7	Natchals . . . . .	749 F		2	Oriskans . . . . .	748 D	
4	Nauvoh . . . . .	750 O		3	Orleans Corners . . . . .	550 N	
6	Nunda . . . . .	746 P		3	Oscawanna . . . . .	852 N	
3	Niskayuna . . . . .	752 A		3	Ossining (d) . . . . .	852 N	
11	Niverville . . . . .	752 K		3	Oswegatchie . . . . .	550 Q	
3	Norfolk . . . . .	551 A		2	Oswego, Oswego Co. (d) . . . . .	619 K	
4	North Bay . . . . .	650 N		4	Otego . . . . .	750 M	
7	North Brookfield . . . . .	750 C		8	Otisville . . . . .	851 E	
3	North Chatham . . . . .	752 K		7	O . . . . .	719 E	
3	North Chittenango . . . . .	650 N		7	Owasco Lake . . . . .	749 B	
6	North Collins . . . . .	747 E		6	Owego, Tioga Co. (d) . . . . .	749 P	
4	North Creek . . . . .	652 E		3	Owls Head . . . . .	551 H	
7	North Darien . . . . .	747 C		4	Oxford, Chenango Co. . . . .	750 K	
7	North Fair Haven . . . . .	649 K		28	Oxford Depot, Orange Co. . . . .	851 M	
4	Northfield . . . . .	750 Q		107	Oyster Bay (d) . . . . .	952 B	
7	North Harford . . . . .	749 M		17	Ozone Park (d) . . . . .	952 A	
4	North Hoosick . . . . .	752 C					
6	North Java . . . . .	747 G			<b>F</b>		
7	North Lansing . . . . .	749 G		6	Fainted Post Office . . . . .	748 Q	
13	North Lawrence . . . . .	551 B		2	Faints (d) . . . . .	648 Q	
2	North Macedon . . . . .	648 P		5	Panama . . . . .	746 O	
107	Northport (d) . . . . .	952 C		7	Paris . . . . .	650 P	
2	North Rose . . . . .	649 N		3	Parish . . . . .	649 M	
7	North Spencer . . . . .	749 L		4	Parlet . . . . .	750 L	
8	North Tonawanda (d) . . . . .	647 N		4	Parksville, Sullivan Co. . . . .	851 A	
3	Northville (d) . . . . .	651 Q		107	Patchogue (d) . . . . .	952 H	
4	Norwich (d) . . . . .	750 F		3	Patterson . . . . .	852 F	
3	Norwood, St. Lawrence Co. (d) . . . . .	551 E		3	Pattersonville . . . . .	751 D	
5	Nunda (d) . . . . .	748 E		2	Pavilion . . . . .	747 D	
28	Nyack (d) . . . . .	852 N		3	Pawling . . . . .	852 F	
3	Nyando . . . . .	551 B		2	Pearl Creek . . . . .	747 D	
	<b>O</b>			28	Pearl River (d) . . . . .	851 Q	
107	Oakdale . . . . .	952 H		107	Peconie . . . . .	953 C	
2	Oakland (d) . . . . .	647 P		3	Pockskill (d) . . . . .	852 I	

For explanation of Abbreviations, Numbers, etc., see pages 10 and 11.

# COLORADO

Supt's Div'n No.	OFFICE	Block No. and Sub-Block Letter	Scale No.	Supt's Div'n No.	OFFICE	Block No. and Sub-Block Letter	Scale No.
	<b>A</b>						
68	Agate.....	1022 I		105	Cedarwood.....	1221 B	
55	Akron.....	922 Q		105	Central City (d).....	1020 B	
105	Alamosa (d).....	1220 I		70	Cheraw.....	1122 O	
105	Alma.....	1019 Q		68	Cheyenne Wells.....	1123 C	
55	Amherst.....	923 H		105	Cimarron.....	1118 K	
105	Antelope.....	1220 N		105	Clifton.....	1017 P	
68	Arapahoe, Cheyenne Co.....	1123 D		105	Cloverly.....	921 K	
69	Arlington.....	1122 L		100	Coalmont.....	919 G	
68	Aroya.....	1122 D		105	Colorado City (d).....	1121 A	
69	Arriba.....	1022 L		105	Colorado Springs (d).....	1121 A	
105	Arrow.....	1020 A		105	Como.....	1020 I	
105	Arvada.....	1020 D		105	Concrete.....	1121 I	
105	Aspen (d).....	1019 N		105	Cornish.....	921 G	
54	Atwood.....	922 G		105	Cotopaxi.....	1120 K	
105	Augusta.....	1221 K		105	Craig.....	918 F	
105	Ault.....	921 F		105	Creele.....	1219 A	
105	Austin, Delta Co.....	1118 A		105	Crested Butte (d).....	1119 A	
105	Avon.....	1019 F		105	Cripple Creek (d).....	1120 H	
105	Avondale.....	1121 P		54	Creek.....	923 A	
				69	Crowley.....	1122 N	
				105	Cuchara Jet.....	1221 F	
	<b>B</b>				<b>D</b>		
105	Barnes.....	1221 K		105	Darlow.....	1021 A	
55	Barr.....	1021 A		105	De Beque.....	1017 M	
105	Baxter.....	1121 L		68	Deer Trail.....	1021 H	
68	Bennett.....	1021 C		105	Del Norte.....	1219 G	
105	Berthoud.....	920 M		105	Delta (d).....	1117 H	
105	Black Hawk, Gilpin Co.....	1020 C		105	Dent.....	921 I	
105	Blanca.....	1220 K		105	Denver (d).....	1021 E	
105	Bloom.....	1222 E		55	Derby.....	1021 A	
105	Boone (A., T. & S. F.).....	1121 P		105	Devine.....	1121 L	
69	Boone (M. P.).....	1121 P		105	Dillon.....	1019 H	
105	Boulder (d).....	920 Q		105	Divide.....	1120 D	
69	Bovina.....	1022 L		105	Dolores.....	1217 K	
68	Boveton.....	1122 C		105	Dumont.....	1020 B	
69	Brandon.....	1123 L		105	Durango (d).....	1218 I	
105	Branson.....	1222 N			<b>E</b>		
105	Breckenridge.....	1019 M		69	Eads.....	1123 I	
105	Briggsdale.....	921 G		105	Eagle.....	1019 E	
105	Brighton.....	1021 A		105	Earl.....	1221 L	
70	Bristol.....	1123 P		105	East Lake.....	1021 A	
105	Broomfield.....	1020 D		105	Eastonville.....	1021 O	
55	Brush.....	922 K		105	Eaton.....	921 F	
105	Buena Vista (d).....	1119 D		55	Ekley.....	923 P	
69	Burrington.....	1023 L		105	Elbert.....	1021 O	
105	Buttes.....	1121 F		105	Elizabeth.....	1021 K	
68	Byers.....	1021 H		105	Elkton.....	1120 H	
	<b>C</b>			105	Eric.....	920 Q	
70	Caddoa.....	1123 N		105	Evans, Weld Co.....	921 K	
69	Calhan.....	1021 P			<b>F</b>		
105	Canon City (d).....	1120 M		105	Fairplay.....	1020 N	
105	Carbondale (d).....	1018 M		69	Falcon.....	1121 B	
105	Carr, Weld Co.....	921 A		69	Flagler.....	1022 M	
105	Castle Rock.....	1021 I					

For explanation of Abbreviations, Numbers, etc., see pages 10 and 11.

UNITED STATES RAILROAD ADMINISTRATION,

Director General of Railroads

**American Railway Express Company**

IN CONNECTION WITH

Canadian Express Company

Canadian NATIONAL Express Company

Dominion Express Company

**JOINT DIRECTORY  
OF  
COLLECTION AND DELIVERY LIMITS  
AT  
EXPRESS STATIONS**

ISSUED December 15, 1919.

EFFECTIVE January 25, 1920.  
Except as noted in individual items.

Over received .....

1919

D. S. ELLIOTT,  
Vice-President  
New York, N. Y.

Issued by  
**GEO. S. LEE,**  
Traffic Manager,  
at Broadway, New York, N. Y.

**NEW YORK**

**ADAMS**—North from S. Corey's residence to Corporate Limits; west on Corporate Limits to Elmwood Cemetery; south from Elmwood Cemetery to Mr. Franklin's residence; south from Mr. Franklin's residence to S. Corey's residence; east from S. Corey's residence to Corporate Limits.

**ADIRONDACK**—Stauben Co., South St. from Cleveland St. south to Cooper Ave.; west on Cooper Ave. to Farmham St.; north on Farmham St. to William St.; east and north on William St. to Cleveland St.; east on Cleveland St. to South St.; north on South St. to Colwell St.; east and north on Colwell St. to Lombough St.; west on Lombough St. to Main St.; south on Main St. to South St.; thence on South St. to Colwell St.; north on South St. to Tuscorora St.; west on Tuscorora St. to Baldwin Ave.; north on Baldwin Ave. to Steuben St.; west on Steuben St. to Grove St.; north and east on Grove St. to Baldwin Ave.; south on Baldwin Ave. to Steuben St.; east on Steuben St. to Main St.; north on Main St. to Front St.; west on Front St. to Smith's Mill and return to Ames St.; north on Ames St. to Maple St.; west on Maple St. to Goodhue St.; north on Goodhue St. to foot of hill and return to Maple St.; west on Maple St. to Wall St.; north on Wall St. to the Sanitarium and return to Front St.

**ALBION—Corporate Limits.**

**ALBANY**—South 5th St. Hudson River west across D. & H. tracks to South Pearl St.; south on South Pearl St. to Sacred Heart Convent and return to McCarthy Ave.; west on McCarthy Ave. to Clare Ave.; north on Clare Ave. to 2d Ave.; west on 2d Ave. to Delaware Ave.; including Dogart Terrace, Alden Ave., Harrows St., Hampton St. and Marshall St. south as far as paved; south-west on Delaware Ave. to Bond Ave.; including Milton St. to McCarthy Ave.; west on Chittenden Road to Matilda St.; including Bard Road and McDonald Road; northeast on Matilda St. to Cuyler Ave.; including Ten York Ave. as far as paved; southeast on Cuyler Ave. to Delaware Ave.; northeast on Delaware Ave. to Leonard Place; including Summit Park, Magnolia Terrace, Delaware Terrace, Beech A. & E. and Providence Place to end; northeast on Leonard Place to Penitentiary and continue to Lark St.; northeast on Lark St. to Morris St.; northwest on Morris St. to New Scotland Ave.; south-east on New Scotland Ave. to Allen St.; including Larch bridge St., Grove Ave. and Wendle Ave.; south to Woodlawn Driving Park; also Janney Place as far as paved; northeast on Allen St. to Cortland St.; northeast on Cortland St. to Marion Ave.; northeast on Marion Ave. to Western Ave.; west on Western Ave. to the intersection of Lenox Ave.; including Brookline Ave. and Lenox Ave. southeast as far as paved; northeast on Fairlawn Ave. from Western Ave. to Malrose Ave.; east on Malrose Ave. to 9th St.; southeast on 19th St. to Western Ave.; southeast on Western Ave. to Manning Boulevard South; northeast on Manning Boulevard South to Cleve-

**ALBANY - (Continued)**

land St.; northeast on Cleveland St. to Bradford St.; southeast on Bradford St. to King Ave.; northeast on King Ave. to Central Ave.; northwest on Central Ave. to residence of F. A. Danker, returning on Central Ave. to Grant Ave.; northeast on Grant Ave. to end; returning to 3d St.; east on 3d St. to Watervellet Ave.; northeast on Watervellet Ave. to New York Central tracks and return to Livingston Ave.; southeast on Livingston Ave. to Rawson St.; southwest on Rawson St. to 3d St.; southeast on 3d St. to Manning Boulevard North; northeast on Manning Boulevard North to No. 74 and return to Livingston Ave.; southeast on Livingston Ave. to Northern Boulevard, including Wilkins Ave., Thornton St., Hoards Ave. and Pennsylvania Ave. to the intersection of Beverly Ave.; northeast on Northern Boulevard to New York Central tracks and return to Van Nostrand St.; southeast on Van Nostrand St. to North Pearl St.; northeast on North Pearl St. to Tiwell St.; including Elmwood St.; from North Pearl St. northeast to end; northeast on Tiwell St. to end; and return to Broadway; northeast on Broadway to Summit St.; northwest on Summit St. to end; and return to North Pearl St.; northeast on North Pearl St. to City Line, including Albany St., Mohawk St., Genesee St., North First St., North Second St., North Third St., Low St., Nobein St. and Stenbert St.; north-west from Pearl St. to end; follow City Line southeast to Broadway; northeast on Broadway to Garbance Lane and return to North St.; southeast on North St. to Hudson River, including Lumber District and City Water Works; thence southeast along Hudson River to South 5th St.

**ALBION**—(Orleans Co.) North Main St. from Corporation Limits south to Erie St.; east on Erie St. to Ingersoll St.; north on Ingersoll St. to end; east from Ingersoll St. to McClelland St. to end; east on Caroline St. to No. 59, east from Ingersoll St. on East Bank St. to East State St.; east on East State St. to Clarendon St.; south on Clarendon St. to Fruit St.; west on Fruit St. to McKinstry St.; south on McKinstry St. to East Ave.; west on East Ave. to South Main St.; south on South Main St. to Corporation Limits; west from South Main St. on east Ave. to Clinton St.; south on Clinton St. to No. 97; west on West Ave. to King St.; north on King St. to West State St.; west on West State St. to end; including the Fair Grounds; north from West State St. on west St. to West Bank St.; east on West Bank St. to Main St.; north on Main St. to Corporation Limits.

**ALBANY**—Bay-Fuller St. from Upper Bay of St. Lawrence River east to Holland Ave.; south on Holland Ave. to James St.; east on James St. to Lower Bay of St. Lawrence River; south on Market St. to Walton St.; east on Walton St. to Holland St.; west on Walton St. from Market St. to Church St.; south on Church St. to Hook St.; east on Hook St. to Walton St.; south on Walton St. to St. Lawrence River; west on Washington St. from Church St. to St. Lawrence River; west and north on Cross-

FIG. 7

# RATE TABLE 1. BLOCK 952.

## MAIN BLOCK TARIFF.

100		200		300		400		500		600		700		800		900		1000		1100		1200		1300		1400		1500	
Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale	Block Scale
103 194	201 203	301 201	402 196	501 200	601 209	702 210	801 235	901 231	1002 205	1102 203	1203 201	1303 204	1405 201	1505 195															
104 199	203 192	302 195	403 193	502 200	602 204	703 216	803 209	902 235	1003 199	1103 201	1204 201	1304 207	1406 190	1506 192															
106 184	204 190	303 193	404 187	503 197	603 204	704 215	804 212	903 204	1004 195	1104 198	1205 201	1305 197	1407 137	1507 187															
107 181	205 187	305 187	405 183	504 191	607 179	705 205	805 201	905 191	1005 189	1105 201	1206 207	1306 194	1408 185	1508 183															
108 171	206 184	306 183	406 180	507 179	608 174	710 164	808 173	906 183	1006 184	1106 185	1207 196	1307 199	1409 183	1509 179															
109 164	207 181	307 179	407 179	508 179	609 166	711 159	810 161	907 178	1007 180	1107 189	1208 201	1308 189	1410 177	1510 174															
110 157	208 173	308 177	408 181	509 179	610 164	712 157	811 157	908 173	1008 174	1108 196	1209 193	1309 185	1411 168	1511 170															
111 150	209 167	309 177	409 181	512 161	611 164	713 153	812 154	909 166	1009 170	1112 166	1211 175	1310 193	1412 161	1513 161															
112 146	210 163	311 156	412 167	513 159	612 159	714 146	813 150	910 165	1010 173	1113 164	1212 166	1311 178	1413 156	1515 149															
113 139	211 160	312 151	413 152	514 164	613 157	715 142	814 145	911 161	1011 165	1114 155	1217 139	1313 162	1414 151	1516 148															
114 129	213 149	313 143	414 145	516 161	614 159	717 132	815 140	912 156	1013 157	1115 143	1218 136	1317 139	1415 150	1518 135															
115 132	214 146	314 143	415 140	517 141	617 129	719 121	816 136	913 153	1014 150	1116 139	1219 125	1318 139	1416 143	1519 131															
116 129	215 143	315 135	416 136	518 127	618 125	720 117	817 133	914 148	1015 141	1117 132	1220 121	1319 131	1417 139	1520 121															
117 125	216 137	316 133	417 133	519 123	619 121	721 109	818 130	916 126	1016 136	1118 132	1221 109	1320 122	1418 135	1521 113															
118 121	217 140	317 130	418 131	520 117	621 109	722 107	819 125	919 125	1017 136	1119 121	1222 106	1321 113	1419 129	1522 111															
119 119	221 111	318 127	423 100	521 113	622 107	723 103	820 118	920 110	1018 129	1120 114	1224 97	1322 106	1420 119	1523 107															
120 114	222 113	319 125	424 100	522 100	623 96	724 97	821 110	921 105	1019 120	1121 109	1225 94	1323 103	1421 115	1524 107															
121 109	223 104	320 121	425 95	523 96	624 94	725 91	822 107	922 100	1020 110	1122 106	1226 90	1324 100	1422 109	1525 106															
122 107	224 100	321 111	426 93	524 92	625 86	726 87	823 100	923 96	1021 107	1123 100	1227 84	1325 100	1423 107	1526 104															
123 103	225 96	322 106	427 90	525 93	626 84	727 84	824 96	924 94	1022 103	1124 96	1228 82	1326 95	1424 104	1527 100															
124 100	226 94	323 103	428 85	526 86	627 81	728 79	825 93	925 92	1023 101	1125 94	1229 74	1327 91	1425 100	1528 93															
125 103	227 90	324 103	429 82	527 85	628 77	729 74	826 88	926 87	1024 98	1126 86	1230 71	1328 86	1426 97	1529 86															
126 96	228 90	325 96	430 73	528 79	629 71	730 67	827 84	927 81	1025 96	1127 82	1231 67	1329 78	1427 93	1530 84															
127 94	229 86	326 92	431 73	529 72	630 67	731 63	828 78	928 76	1026 92	1128 79	1232 63	1330 74	1428 86	1531 80															
128 94	230 86	327 90	432 69	530 71	631 63	732 59	829 74	929 72	1027 87	1129 75	1233 59	1331 71	1429 82	1532 78															
129 94	231 78	328 84	433 67	531 69	632 59	733 55	830 67	930 71	1028 78	1130 70	1234 55	1332 67	1430 78	1533 71															
130 96	232 78	329 84	434 65	532 67	633 58	734 52	831 61	931 65	1029 74	1131 67	1235 52	1333 67	1431 75	1534 69															
131 91	233 78	330 78	435 63	533 65	634 55	735 46	832 59	932 59	1030 67	1132 59	1236 48	1334 63	1432 75	1535 63															
132 94	234 78	331 75	436 63	534 59	635 55	736 44	833 55	933 54	1031 63	1133 54	1237 46	1335 56	1433 70	1536 61															
133 86	237 67	332 75	437 61	535 59	636 49	737 43	834 50	934 48	1032 56	1134 48	1238 43	1336 51	1434 63	1537 61															
	257 35	333 73	438 59	536 47	637 46	738 43	835 44	935 44	1033 54	1135 45	1239 45	1337 47	1435 58	1538 59															
	258 35	334 67	439 63	537 54	638 43	739 41	836 44	936 44	1034 45	1136 44	1240 43	1338 51	1436 57	1539 58															
		335 67	440 50	538 59	639 42	740 39	837 42	937 47	1035 45	1137 43	1241 45	1339 50	1437 57	1540 56															
		336 67	441 50	539 50	640 42	741 38	838 41	938 41	1036 48	1138 42	1242 46	1340 50	1438 51	1541 56															
		337 65	442 50	540 47	641 41	742 38	839 39	939 39	1037 43	1139 42	1243 44	1341 48	1439 49	1542 51															
		338 63	445 27	541 47	642 42	743 38	840 38	940 38	1038 41	1140 41	1244 38	1342 46	1440 54	1543 44															
		339 58	456 27	542 46	643 42	745 29	841 38	941 38	1039 39	1141 41	1245 35	1343 41	1441 50	1544 44															
		340 51	457 29	543 44	646 24	746 27	842 36	942 33	1040 39	1142 41	1246 29	1344 38	1442 48	1545 49															
		341 51	458 31	549 23	647 21	747 21	843 35	943 33	1041 36	1143 39	1247 29	1345 35	1443 46	1546 41															
		357 33		550 23	648 19	748 13	844 31	944 29	1042 35	1144 28	1248 24	1346 31	1444 44	1547 44															
		358 33		551 21	649 17	749 17	845 29	945 27	1043 31	1145 23	1249 27	1347 33	1445 38	1548 41															
				552 18	650 17	750 16	846 27	946 22	1044 31	1146 23	1250 23	1348 29	1446 38	1549 41															
				553 21	651 17	751 17	847 23	947 21	1045 27	1147 23																			
				554 21	652 16	752 11	848 21	948 16	1046 24	1148 18																			
				555 23	653 18	753 11	849 18	949 13	1047 23	1149 18																			
				556 25	654 18	754 13	850 17	950 11	1048 18	1150 16																			
				557 27	655 16	755 18	851 15	951 15	1049 15	1151 16																			
				558 29	656 23		852 15	952 15	1050 11																				
				559 31			853 15	953 15	1051 15																				
							854 17																						
	</																												



## SUB-BLOCK TARIFF.

[illegible]

To—	From block 952, sub-block—																To—	From block 952, sub-block—															
Bk.	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	Bk.	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q
952	A	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	A	3	3	4	5	3	3	5	4	8						
952	B	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	B	3	3	3	4	3	3	4	3	8						
952	C	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	C	4	3	3	3	3	4	3	5	8						
952	D	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	D	5	4	3	3	5	5	4	5	8						
952	E	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	E	3	3	3	4	3	3	3	4	8						
952	F	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	F	3	3	3	3	3	3	3	4	8						
952	G	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	G	5	4	3	3	5	5	3	4	8						
952	H	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	H	8	8	5	5	5	5	4	3	8						
952	I	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	I	8	8	5	5	5	5	4	3	8						
952	K	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	K	8	8	8	8	8	8	8	8	8						
952	L	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	L	8	8	8	8	8	8	8	8	8						
952	M	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	M	8	8	8	8	8	8	8	8	8						
952	N	3	4	5	3	3	4	5	8	8	8	8	8	8	8	8	952	N	3	4	5	3	3	4	5	8	8						
952	O	4	5	3	3	3	3	5	8	8	8	8	8	8	8	8	952	O	4	5	3	3	3	5	8	8	8						
952	P	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	P	8	8	8	8	8	8	8	8	8						
952	Q	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	952	Q	8	8	8	8	8	8	8	8	8						

[illegible]

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SCALES 99 to 109.

Schedule of First and Second-Class Express Rates in cents.

Scale Numbers.																							
Pounds.	99		100		101		102		103		104		105		106		107		108		109		Pounds.
	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	
1	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	43	1
2	48	48	48	48	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	2
3	57	57	57	57	57	57	57	57	57	57	57	57	57	57	58	58	58	58	58	58	58	58	3
4	64	64	64	64	64	64	64	64	66	66	66	66	66	66	66	66	66	66	67	67	67	67	4
5	71	71	71	71	71	71	72	72	72	72	72	72	72	72	73	73	73	73	73	73	73	73	5
6	78	78	78	78	79	79	79	79	79	79	81	81	81	81	81	81	82	82	82	82	82	82	6
7	84	84	86	86	86	86	86	87	87	87	87	87	87	87	88	88	88	88	89	89	89	89	7
8	93	93	93	93	93	93	95	95	95	95	96	96	96	96	96	96	97	97	97	97	98	98	8
9	100	100	100	100	101	101	101	101	102	102	102	102	102	102	103	103	103	103	106	106	106	106	9
10	107	107	107	107	108	108	108	108	110	110	110	110	111	111	111	111	112	112	112	113	113	113	10
11	113	113	115	115	116	116	116	116	117	117	117	117	118	118	120	120	121	121	121	122	122	122	11
12	121	121	122	122	123	123	123	125	125	125	125	126	126	126	127	127	127	127	129	129	129	129	12
13	129	129	129	129	130	130	131	131	131	131	131	131	131	131	132	132	132	132	133	133	133	133	13
14	136	136	136	136	137	137	137	139	139	140	140	140	140	140	141	141	142	142	143	143	143	143	14
15	142	142	144	144	144	144	145	145	147	147	147	147	149	149	149	150	151	151	152	152	152	152	15
16	150	151	151	151	152	154	154	154	156	156	155	155	156	156	157	158	159	159	159	161	161	161	16
17	156	157	158	158	159	159	161	161	163	162	164	163	164	163	165	164	166	165	168	166	169	169	17
18	165	165	165	165	166	165	168	166	169	167	170	168	170	168	173	170	175	173	176	176	178	178	18
19	171	172	173	173	175	173	176	173	178	174	179	174	179	174	180	175	181	176	183	183	184	184	19
20	179	180	180	180	181	183	183	183	184	183	185	183	185	183	186	184	189	184	192	192	193	193	20
21	185	189	186	140	189	142	190	143	192	144	193	145	194	146	197	148	198	149	199	149	200	150	21
22	193	145	194	146	197	148	198	149	199	149	200	150	203	152	204	153	205	154	207	155	208	156	22
23	200	150	203	152	204	153	205	154	207	155	208	156	209	157	212	159	213	160	214	161	217	163	23
24	208	156	209	157	210	158	212	159	214	161	217	163	218	164	219	164	221	166	223	167	224	168	24
25	214	161	217	163	218	164	221	166	222	167	223	167	224	168	227	170	228	171	231	173	232	174	25
26	222	167	223	167	226	170	227	170	228	171	232	174	233	175	234	176	237	178	238	179	239	179	26
27	228	171	232	174	233	175	234	176	237	178	238	179	239	179	242	182	244	183	247	185	248	186	27
28	237	178	238	179	239	179	242	182	244	183	247	185	248	186	249	187	252	189	253	190	256	192	28
29	244	183	246	185	248	186	249	187	252	189	253	190	255	191	258	194	260	195	262	197	263	197	29
30	251	188	252	189	255	191	256	192	260	195	261	196	263	197	265	199	267	200	268	201	272	204	30
31	258	194	261	196	262	197	265	199	266	200	268	201	270	203	273	205	276	207	277	208	280	210	31
32	265	199	267	200	270	203	272	204	275	206	276	207	278	209	281	211	282	212	286	215	287	215	32
33	273	205	275	206	277	208	280	210	281	211	284	213	286	215	289	217	291	218	292	219	295	221	33
34	280	210	281	211	284	213	287	215	290	218	291	218	294	221	296	222	297	223	301	226	304	228	34
35	287	215	290	218	291	218	294	221	296	222	300	225	301	226	304	228	306	230	309	232	310	233	35
36	294	221	296	222	300	225	302	227	304	228	306	230	309	232	311	233	315	236	316	237	319	239	36
37	301	226	304	223	306	230	309	232	311	233	315	236	316	237	319	239	321	241	324	243	328	244	37
38	309	232	310	233	314	236	316	237	319	239	321	241	324	243	326	246	330	248	333	250	335	251	38
39	316	237	319	239	321	241	324	243	326	246	330	248	331	248	334	251	336	252	339	254	343	257	39
40	323	242	325	244	329	247	331	248	334	251	336	252	339	254	343	257	345	259	348	261	350	263	40
41	330	248	333	250	335	251	338	254	341	256	344	258	347	260	350	263	353	265	357	268	359	269	41
42	336	252	339	254	341	258	347	260	349	262	352	264	355	266	358	269	360	270	363	272	365	274	42
43	345	259	348	261	350	263	353	265	357	268	359	269	362	272	365	274	367	277	372	279	374	281	43
44	352	264	355	266	358	269	360	270	364	273	367	275	370	278	373	280	375	281	379	284	383	287	44
45	359	269	362	272	364	273	369	277	372	279	374	281	377	283	381	286	384	288	387	290	389	292	45
46	365	274	369	277	373	280	375	281	378	284	383	287	386	290	389	291	392	294	394	296	398	299	46
47	373	280	377	283	379	284	383	287	387	290	389	292	392	294	397	298	399	299	403	302	406	305	47
48	381	286	384	288	387	290	391	293	393	295	398	299	401	301	403	302	407	305	411	308	415	311	48
49	388	291	391	293	394	296	398	299	402	302	404	303	407	305	412	309	415	311	418	314	421	316	49
50	394	296	398	299	402	302	404	303	408	306	412	309	416	312	418	314	422	317	426	320	430	323	50

FIG. 10

Schedule of First and Second-Class Express Rates in cents.

Scale Numbers.																							
99		100		101		102		103		104		105		106		107		108		109			
Pounds.	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	1st Class	2d Class	Pounds.
51	402	302	406	305	408	306	413	310	416	312	420	315	422	317	427	320	431	323	433	325	438	329	51
52	408	306	413	310	417	313	420	315	425	319	427	320	431	323	435	326	438	329	442	332	445	334	52
53	417	313	420	315	425	319	428	321	431	323	435	326	438	329	442	332	446	335	449	337	454	341	53
54	425	319	427	320	431	323	435	326	440	330	442	332	446	335	450	338	454	341	457	343	461	346	54
55	431	323	435	326	438	329	442	332	446	335	450	338	454	341	457	343	461	346	466	350	469	352	55
56	438	329	442	332	446	335	450	338	454	341	457	343	461	346	466	350	470	353	473	357	476	357	56
57	445	334	449	337	454	341	457	343	461	346	466	350	469	352	473	355	476	357	481	361	485	364	57
58	454	341	456	342	460	345	464	348	469	352	473	355	476	357	481	361	485	364	489	367	494	371	58
59	460	345	464	348	469	352	473	355	476	357	481	361	484	363	488	366	491	368	496	372	500	375	59
60	467	350	471	353	475	356	480	360	484	363	488	366	491	368	496	372	500	375	504	378	509	382	60
61	474	356	478	359	483	362	486	365	490	368	495	371	499	374	504	378	509	382	513	385	517	388	61
62	481	361	485	364	490	368	495	371	499	374	503	377	508	381	512	384	515	386	519	389	524	393	62
63	489	367	494	371	498	374	501	376	505	379	510	383	514	386	519	389	524	393	528	396	532	399	63
64	496	372	500	375	504	378	509	382	514	386	518	389	523	392	527	395	530	398	537	403	541	406	64
65	503	377	508	381	512	384	517	388	522	392	525	394	529	397	536	402	539	404	543	407	547	410	65
66	510	383	514	386	519	389	524	393	528	396	533	400	538	404	542	407	547	410	552	414	556	417	66
67	517	388	523	392	527	395	530	398	537	403	541	406	544	408	551	413	554	416	559	419	564	423	67
68	525	394	529	397	534	400	539	404	543	407	549	412	553	415	557	418	563	422	567	425	572	429	68
69	532	399	537	403	542	407	546	410	552	414	556	417	559	419	566	425	570	428	575	431	580	435	69
70	539	404	543	407	549	412	553	415	558	419	563	422	568	426	572	429	578	434	582	437	587	440	70
71	546	410	552	414	556	417	561	421	566	425	571	428	575	431	581	436	586	440	591	443	596	447	71
72	553	415	558	419	564	423	568	426	573	430	578	434	583	437	588	441	593	445	599	449	602	452	72
73	561	421	566	425	571	428	577	433	581	436	586	440	591	443	596	447	601	451	606	455	611	458	73
74	568	426	572	429	578	434	583	437	588	441	593	445	599	449	605	454	609	457	614	461	620	465	74
75	575	431	581	436	585	439	591	443	596	447	601	451	606	455	611	458	616	462	622	467	626	470	75
76	582	437	587	440	593	445	599	449	602	452	609	457	614	461	620	465	625	469	629	472	635	476	76
77	588	441	595	446	600	450	606	455	611	458	616	462	621	466	626	470	633	475	638	479	643	482	77
78	597	448	601	451	607	455	612	459	619	464	624	468	629	472	635	476	640	480	646	485	651	488	78
79	605	454	610	458	615	461	621	466	626	470	633	475	636	477	641	481	648	486	653	490	658	494	79
80	611	458	616	462	622	467	627	470	634	476	639	479	644	483	650	488	655	491	662	497	667	500	80
81	618	464	624	468	629	472	635	476	640	480	646	485	651	488	658	494	664	498	669	502	675	506	81
82	624	469	630	473	638	479	644	483	649	487	654	491	660	495	665	499	670	503	677	508	682	512	82
83	631	476	639	479	644	483	650	488	655	491	662	497	667	500	674	506	679	509	684	513	690	518	83
84	639	480	646	485	651	488	656	492	664	498	669	502	675	506	680	510	685	514	693	520	698	524	84
85	648	486	653	490	658	494	665	499	670	503	677	508	682	512	689	517	694	521	699	524	706	530	85
86	654	491	660	495	667	500	672	504	678	509	684	513	690	518	696	522	703	527	708	531	713	535	86
87	662	497	668	501	674	506	679	509	685	514	692	519	697	523	704	528	709	532	717	538	722	542	87
88	669	502	675	506	680	510	688	516	693	520	699	524	706	530	711	533	718	539	723	542	731	548	88
89	677	508	682	512	689	517	694	521	702	527	707	530	712	534	719	539	725	544	732	549	737	553	89
90	683	512	689	517	696	522	702	527	708	531	713	535	721	541	726	545	733	550	738	554	746	560	90
91	690	518	697	523	703	527	709	532	716	537	722	542	727	545	735	551	741	556	747	560	753	565	91
92	697	523	704	528	711	533	717	538	723	542	730	548	736	552	743	557	748	561	755	566	761	571	92
93	706	530	711	533	718	539	725	544	731	548	737	553	743	557	750	563	757	568	762	572	769	577	93
94	712	534	718	539	725	544	732	549	738	554	745	559	751	563	759	569	764	573	771	578	777	583	94
95	719	539	726	545	732	549	738	554	746	560	752	564	759	569	765	574	772	579	779	584	785	589	95
96	726	545	733	550	740	555	747	560	752	564	760	570	766	575	774	581	780	585	786	590	793	595	96
97	733	550	740	555	747	560	753	565	761	571	767	575	774	581	780	585	788	591	794	596	801	601	97
98	741	556	747	560	753	563	761	571	767	575	775	581	781	586	789	592	795	596	803	602	809	607	98
99	748	561	755	566	762	572	769	577	776	582	782	587	789	592	795	596	803	602	809	607	816	612	99
100	755	566	762	572	769	577	776	582	782	587	790	593	796	597	804	603	810	608	818	614	824	618	100

Charges on shipments over 100 lbs. must be computed as per instructions on page 3.

## EXPLANATION.

### ITEM 1. Rates for Shipments 100 Pounds and Under.

The rates contained in the scales shown in this tariff are separately stated for packages of first-class and second-class matter weighing respectively from 1 pound to 100 pounds.

There are 295 of these scales, numbered consecutively from 0 upward. The Rate Scale numbers printed in Rate Tables 1 and 2 of the "Local and Joint Block Tariffs," Supplements thereto and reissues thereof, lawfully on file with the Interstate Commerce Commission, refer to these scales.

### ITEM 2. Rates for Shipments Over 100 Pounds.

#### FIRST-CLASS RATES.

When the scale number is known, charges on shipments of over 100 pounds must be ascertained by multiplying the rate for a 100-pound package by the number of pounds in the shipment and dividing the product by 100.

#### EXAMPLE.

Under rate scale 45 what is the charge for 583 pounds of first-class matter?

The first-class rate for 100 pounds being \$3.81—

$$3.81 \times 583 = 2221.23.$$

$$2221.23 \div 100 = 22.2123.$$

Under the rule of the Classification that all fractions of a cent shall be equalized as 1 cent, the charge would be \$22.22.

#### SECOND-CLASS RATES.

Second-class charges on shipments of over 100 pounds are first computed at the first-class rate by multiplying the first-class rate by the number of pounds in the shipment; 75 per cent. of the result is the charge on second-class matter.

#### EXAMPLE.

Under rate scale 45 what is the charge for 250 pounds of second-class matter?

$$3.81 \times 250 = 952.50.$$

$$952.50 \text{ equalized as } \$9.53.$$

$$75 \text{ per cent. of } \$9.53 = 7.15.$$

The second-class charge for 250 pounds at \$3.81 is therefore \$7.15.

Fig. 9. It will be noted by reference to Fig. 8 that the word *SUB* appears beside certain of the block numbers, as in connection with blocks 951, 952, and 953, which indicates that reference must be made to the subblock tariff.

**16.** The scale number to be applied between the two points in question having been ascertained, it is necessary next to refer to a publication that is described on its title page as *Local and Joint Schedule of First and Second Class Express Rates*. Figs. 10 and 11, which are pages from this publication, show the rates applicable in connection with Scale 107. Two features of these rates to which attention is called are: (1) that while the rates vary with the weight they do not vary in proportion to the weight. This is illustrated by the fact that while for Scale 107 the first-class rate for 1 pound is 43 cents, the rate for 100 pounds is \$8.10; (2) for weights up to and including 6 pounds, the first-class and second-class rates are the same.

The methods of figuring charges in connection with the tariff under discussion are explained in Fig. 12, and attention is particularly directed to the method to be followed in computing charges on shipments taking a second-class rate and weighing over 100 pounds. A study of this explanation will show that charges are found by taking 75 per cent. of the *charges* figured on the first-class rate; by this method, differences in carrying forward fractions of a cent are avoided.

Reference to Fig. 3 shows that organ stools, boxed, take a first-class rate, and reference to Fig. 11 shows that the first-class rate for Scale 107 for 100 pounds is \$8.10. In this way the charges on the shipment under consideration have been found by the use of the various publications, which is typical of methods to be followed in figuring charges on shipments subject to class rates.

**17. Pound Rates.**—In connection with the rates shown in Figs. 10 and 11, it is important to note that Rule 1 (*k*), shown in the *Express Classification Rules* given in Art. 6, makes provision for what are called *pound rates*, by which weights less than 100 pounds may go at the same rate per pound as applies to weights of 100 pounds.

Only two supplements to this tariff will  
be in effect at any time.

Ohio No. 98.  
Cancels Ohio No. 42.

**I. C. C. No. 1513.**  
Cancels I. C. C. No. 160.  
**C. R. C. No. 7154.**  
Cancels C. R. C. No. 123.

# American Railway Express Company

## LOCAL COMMODITY TARIFF No. 6

Applying on

**Butter, Cantaloupes, Cheese, Dressed Poultry, Eggs, Fish,  
Fish Roe, Fruit, Melons and Vegetables**

**IN CARLOADS**

Between

STATIONS IN THE STATES OF

**IDAHO MONTANA OREGON WASHINGTON**

And

STATIONS IN THE STATES OF

Alabama	Kansas	Montana	Pennsylvania
Arkansas	Kentucky	Nebraska	South Dakota
California	Louisiana	Nevada	Tennessee
Colorado	Maryland	New Jersey	Texas
District of Columbia	Massachusetts	New York	Utah
Idaho	Michigan	North Dakota	Washington
Illinois	Minnesota	Ohio	West Virginia
Indiana	Mississippi	Oklahoma	Wisconsin
Iowa	Missouri	Oregon	Wyoming

**SHOWN HEREIN**

On Interstate Traffic only.

Except on Traffic Originating on the Great Northern Ry. and the Northern  
Pacific Ry. and subsidiary lines (see Item 1, page 2).

Governed by Official Express Classification No. 27, I. C. C. No. 1500, Sup-  
plements thereto and reissues thereof.

Governed by and applying in connection with Joint Directory of Express  
Stations I. C. C. No. A-3 (FGA), Supplements thereto and reissues thereof.

Governed by Terminal and Switching Charges I. C. C. No. A-2095 (FGA),  
Supplements thereto and reissues thereof.

By authority of Rule 39 of Interstate Commerce Commission Tariff Circular No. 19-A, this tariff is not made applicable from  
or to all intermediate points. Upon reasonable request therefor rates which will not exceed those in effect from or to more distant  
points will, under authority granted by the Interstate Commerce Commission, be established from or to any intermediate point  
hereunder upon one day's notice to the Commission and to the Public.

**ISSUED December 18, 1920.**

**EFFECTIVE February 15, 1921.**

Date received

1920.

**D. S. ELLIOTT,**

Vice-President.  
New York, N. Y.

Issued by

**GEO. S. LEE,**

Traffic Manager,  
51 Broadway, New York, N. Y.

FIG. 13



**SECTION 1—Continued.**

**ITEM No. 5.**

**Loading in Transit.**

(a) Partial loading in transit at not to exceed one point directly intermediate between initial point of shipment and destination will be permitted at an additional charge of \$6.93 upon carload shipments of **Fish, Fruit and Vegetables** (Eastbound) for one consignee. Charges will be assessed upon the total weight of the contents of the car upon completion of final loading, but not less than the authorized minimum weight at the rates named in tariff from initial shipping point to final destination.

(b) Partial loading of shipments originating at offices on branch lines, or at other offices through which car does not pass in transit, will be permitted without additional charge when the local rate is paid from such branch line office or other office to junction point through which the car passes.

(c) Partial loading in transit of **Butter, Cheese, Dressed Poultry and Eggs** (Westbound), will be permitted at not to exceed two points west of Chicago upon carload shipments for one consignee at an additional charge of \$6.93 for each such partial loading, provided all partial loadings are done at points through which the car passes enroute from initial point of shipment to final destination. Charges must be assessed upon the total weight of the contents of the car upon completion of final loading but not less than the authorized minimum weight at the rates named in tariff from initial shipping point to final destination.

(d) Partial loading in transit of **Butter, Cheese, Dressed Poultry and Eggs** (Westbound), will also be permitted west of Chicago without additional charge from offices on branch lines or from offices through which the car does not pass in transit, provided the local rate is paid from such branch office or other office to a junction point through which the car passes.

**ITEM No. 6.**

**Unloading in Transit.**

(a) Carload shipments of **Fish, Fruit and Vegetables** from points in Idaho, Montana, Oregon or Washington to points in the States shown herein (except California) may be opened and partially unloaded at not more than two intermediate points through which the car must pass enroute from initial point of shipment to final destination. An additional charge of \$6.93 must be made for each such partial unloading. If desired, Fish, unloaded at intermediate points, under this rule, will be delivered by the Express Company to one or more local addresses for an additional charge of 20 cents per 100 pounds on the net weight of the Fish so delivered.

Under this rule Salt Lake City, Utah, will be considered an intermediate point in relation to carload shipments from points in Idaho, Oregon or Washington to Colorado Springs, Colo., Denver, Colo., or points east thereof.

Under this rule Denver, Colo., will be considered an intermediate point in relation to carload shipments from points in Idaho, Oregon or Washington to Omaha, Neb., Kansas City, Mo., or points east thereof.

Under this rule Salt Lake City, Utah, will be considered an intermediate point in connection with carload shipments from points in California destined to points beyond Ogden, Utah.

Under this rule Minneapolis and St. Paul, Minn., will be considered as intermediate points in relation to carload shipments from points in Idaho, Oregon or Washington, to Sioux City, Ia., and Sioux Falls, S. D.

Under this rule unloading will not be permitted at points in Iowa or Minnesota south of St. Paul, Minn., except Sioux City and Council Bluffs, Ia., from cars routed via St. Paul with final destination Omaha, Neb., Kansas City, Mo., or St. Joseph, Mo.

Under this rule partial unloading at Lewistown, Mont., will be permitted on shipments consigned to Great Falls, Mont., ONLY when charges are assessed on the entire shipment at the rate named in this tariff to Lewistown plus the foregoing unloading charge.

(b) Carload shipments of **Fish, Fruit and Vegetables**, between points in Idaho, Montana, Oregon or Washington and points in California may be partially unloaded enroute at not to exceed one office directly intermediate via the route over which car travels to the station to which the car is shipped. An additional charge of \$6.93 must be assessed for such service.

(c) Carload shipments of **Fruit and Vegetables** (Westbound) from offices in the States of Alabama, Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Tennessee and Texas, may be partially unloaded at not more than one point west of St. Paul, Minn., Kansas City, Mo., or Omaha, Neb., and directly intermediate to the office to which the car is destined. The cost of such partial unloading is \$6.93.

(d) Under the above rules permitting partial unloading, all labor in connection therewith must be performed by the consignee or his agents, except that where a car arrives at the intermediate unloading point in the night time between the hours of 7 P.M. and 7 A.M., the partial unloading must be made under the supervision of the consignee or his agent, who may be assisted by employees of the carrier. Carrier will make no additional charge for labor furnished under this rule, nor will it assume any liability for error or damage due to such partial unloading.

(e) Where instructions are given to unload at intermediate points from carloads in transit, under this tariff, cars will be set out of train at such intermediate points to accomplish such unloading, and forwarded in the next available train, except where the amount to be unloaded is small in volume and may be unloaded without delaying the train for that purpose, and the rules of the Railroad Company will permit such unloading in the passenger train shed.

**ITEM No. 7.**

**Loading or Unloading of Carload Shipments.**

(a) Carload shipments must be loaded and packed in the car at the shipping point or at the partial loading point enroute by shipper at shipper's expense. The carrier will not be responsible, directly or indirectly, for loss by reason of any discrepancy in the count, nor for damage resulting from improper bracing or insufficient packing.

(b) **Braces and Strips.**

Strips and braces used for securing packages of Fruits and Vegetables moved under this tariff must be furnished by or at the expense of shipper. When strips or braces are furnished by the Express Company an additional charge to cover the cost will be assessed against the shipment.

**ITEM No. 8.**

**Switching Charge in Connection with Precooling Plant at Puyallup, Wash.**

Carload shipments originating either at Sumner or Puyallup, Wash., and destined to receiving points named in this tariff, will be switched from one point to the precooling plant located at Puyallup, Wash., and after cars are pre-cooled will be required to main track without additional charge.

Cars partially loaded at Puyallup, Wash., and switched to Sumner, Wash., for final loading, then returned to Puyallup for precooling, a switching charge of \$3.47 per car will be assessed for this service.

On cars from Auburn, Wash., to precool at Puyallup, Wash., a switching charge will be made by the Railway Company of \$3.32 per car.

**ITEM No. 9.**

**Refrigerator Equipment.**

The Express Company has arranged for a limited number of refrigerator cars and to the extent available these cars will be furnished on shipments of perishable goods. The carrier will not be responsible for damage to goods when the cars are furnished by the shipper or the Railroad Company. Cars will be handled only on trains designated by the Railway Company.





For example, in Fig. 11, under Scale 99 the first-class rate for 100 pounds is 755 cents. If pound rates were granted on a commodity that otherwise would go first class, the charges on a shipment weighing 56 pounds would, according to the rule given, be calculated as follows:  $755 \times 56 = 42,280$ , and this product divided by 100 = 422.8 cents, or \$4.23. It will be seen in the table, that the scale rate for 56 pounds is \$4.38.

Pound rates apply only when specifically named in the publication.

**18. Commodity Tariffs.**—Commodity tariffs are issued in the express business, although their use is not so widespread in the express as in the freight service. Figs. 13, 14, and 15 are portions of one of the commodity tariffs issued by express companies. One of the features of this tariff, as shown in Fig. 14, is the provision made for loading and unloading cars in transit.

**19. Special-Service Tariffs.**—Though in the express business carload traffic is largely confined to certain specified kinds, it is of sufficient importance to require that provision be made for switching and terminal services, especially at fair grounds and race tracks. Necessary regulations of this kind are, to a considerable extent, carried in a publication entitled Local and Joint Tariff of Terminal and Switching Charges No. 1, from which are taken the following rules which illustrate in part the great variety of services performed by the companies.

**63 White River Junction, Vt.**—Vermont State Fair Grounds—The rate to or from the Vermont State Fair Grounds at White River Junction, Vt., is 8 Scale numbers more than the rate to or from White River Junction, Vt. (See Rule 1.)

Carload shipments of Live Stock will not be transported beyond the depot, and no arrangements for such additional service shall be made nor additional charge assessed.

**64 Windsor, Ont.**—The charge for switching carload shipments of Horses to or from the Race Track is \$10.00 per car.

**65 Worcester, Mass.**—Fair Grounds—The rate on carload shipments to or from the Fair Grounds is \$4.80 per car more than the Worcester, Mass., rate.

**66 Youngstown, O.**—Southern Park Race Track—Rate on carload shipments to or from Southern Park Race Track at Youngstown, O., is \$14.00 per car more than rate to or from Youngstown, O.

## MISCELLANEOUS RULES

- 67 Shipments Consigned to Foreign or Domestic Steamship Lines at New York, N. Y., Brooklyn, N. Y., Hoboken, N. J., or Jersey City, N. J.

The charges shown below must be collected on shipments of Freight consigned to Foreign or Domestic Steamship Lines, or delivered at a Dock of a Foreign or Domestic Steamship Line by the order of the shipper or the consignee, at either New York, N. Y., Brooklyn, N. Y., Hoboken, N. J., or Jersey City, N. J., in addition to the transportation charge; this additional charge is made to cover the cost of delivery, and includes the free return of Steamship Company's receipt, if desired by the owner.

The additional charge made by this rule will not apply to shipments of personal baggage or packages consigned to passengers on steamers, or goods for consignees whose regular place of business is at a pier.

Shipments weighing 500 lbs. or less.....25c per cwt.

Minimum charge 50 cents.

Shipments weighing over 500 lbs. and not over

5,000 lbs.....20c per cwt.

but the charge must not be less than for 500 lbs.

Over 5,000 lbs.....15c per cwt.

but the charge must not be less than for 5,000 lbs.

The above rates will also apply on Silver Bullion on the basis of 100 lbs. per \$1,000 value.

- 68 Track Storage Charge at St. Louis (Mo.) Union Station.

A charge of \$2.00 per car per day (24 hours) or fraction thereof will be made at the expiration of 24 hours after the first 7 A. M. following notification of the arrival of the car for each car held in excess of that time on Union Station Tracks at St. Louis, Mo., for unloading by consignee.

- 69 Storage Charge at Kansas City Union Station.

An additional charge of \$1.00 per car per day or fraction thereof will be made at the expiration of 24 hours after 12 o'clock midnight of the day upon which a car arrives for each car held in excess of that time for unloading by consignee on Union Station Tracks at Kansas City, Mo. No time allowance for Sundays or holidays. This is a track storage charge assessed by the Kansas City Terminal Railway Company.

- 70 Disinfecting and Cleaning Cars.

When, on account of Federal, State, County or Municipal Regulations, it is necessary to clean and disinfect cars which have been used for the transportation of carload shipments of Live Stock by

express, a charge of \$2.50 per car for cleaning and disinfecting will be assessed against the shipment transported in the car which is required to be cleaned and disinfected under such regulations.

EXCEPTION—The charge for disinfecting and cleaning cars to be used for intrastate shipments in Illinois is 75 cents for a single-deck car and \$1.25 for a double-deck car. Issued in compliance with order of State Public Utilities Commission of Illinois in Case No. 4396.

#### RULES FOR CANADA

- 71 Detention Charges**—On cars held at points in Canada by shipper or consignee for loading, unloading, forwarding directions or for any other purpose, 24 hours (one day) free time shall be allowed. When for any reason for which the Express Company or the Railway Company is not responsible, cars in express service are held beyond the said free time for loading or after loading, or for unloading following notice of arrival (if necessary) or placement, the following tolls shall be charged for each day of 24 hours, or part thereof, Sundays and legal holidays to be excluded in computing time:

Stable cars, when used as such..... \$25.00

Other express cars (including dismantled stable cars)..... 15.00

Freight cars used for express goods..... 10.00

- 72 Deposits for Special Cars**—At points in Canada, where a car of special type or an extra car for a special shipment is asked for, an application must be made in writing and be accompanied by a deposit of \$25.00, which amount will be applied on the charge for transportation if paid by the shipper, or refunded if paid by the consignee. When a car is not furnished, the amount of \$25.00 deposited will be refunded.

When a car is furnished within 48 hours of the time specified and the applicant refuses or fails to make use of it, the deposit of \$25.00 will be retained by the Company.

- 73 Unloading in Transit of Horses or Live Stock for Feed and Rest**—When cars of Horses or other Live Stock are unloaded in transit at points in Canada for feed and rest, the charge for switching same to and from stock yards or other unloading sidings will be \$10.00 per car, unless such service becomes necessary owing to the negligence of the company or the rail carrier.
- 74 Extraordinary Shipments**—(a) Unless otherwise provided herein, at points in Canada the charge for switching carloads of Live Stock, extraordinary shipments, such as heavy pieces of machinery, and other traffic for which the Companies are not required to perform wagon service, to or from stock yards, wharves, private sidings, or team tracks not contiguous or adjacent to the usual passenger train terminal for shipments carried by express, is as follows:

When the car has reached its destination station over the line of the Railway Company which performs the switching service—\$15.00 per car.

When the car has reached its destination station over the line of another Railway Company than that which performs the switching service—\$25.00 per car.

(b) On competitive carload traffic the cost of switching to sidings of another Company which could have handled the traffic, either over its own line or in connection with other Companies, at the same rates, or to sidings contiguous thereto, will be absorbed.

(c) In waybilling carload shipments, the switching charge (if any) must be shown as a separate entry on the waybill.

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### THE MONEY DEPARTMENT

20. In addition to its activities in the handling of ordinary merchandise, live stock, and food stuffs, the express companies, through the Money Department, provide for the transportation of valuable property that must be kept in the personal charge of representatives of the companies from the time it leaves the hands of the shipper until it is delivered into the hands of the consignee. The class of property handled by this department includes currency, securities, jewelry, valuable papers, etc. The regulations governing the work of this department are given in the Money Classification, which is included in the same publication as the Express Classification. A study of this publication will show that many of the activities of the Money Department are not transportation services, but include such special services as the making of collections, the payment of taxes, etc. In most cases, services of this latter class are not subject to the jurisdiction of the Interstate Commerce Commission, because they are not transportation services.

Since the work of the Money Department is remotely connected with what is generally considered as traffic work, it is sufficient here to reproduce portions of the Money Classification to show the nature and scope of this important branch of the express business. Fig. 16 is a page of the index to the Money Classification; Fig. 17 is a portion of the rules governing the classification, and Fig. 18 shows the methods of assessing charges on certain traffic subject to the Money Classifi-

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Too heavy to carry by hand	48	C (2)
United States or Canadian Silver	48	C (2)
Collections	49	F (2)
Identity of Senders	49	F (8)
Not received more than 20 days before due	49	F (8)
Not to be made unless in Collection Envelope	49	F (11)
Paid, Remit direct to Shipper	49	F (9)
Partial payment	49	F (1)
Received by Mail	49	F (10)
Service beyond the usual C. O. D. service	49	F (12)
Unpaid, explaining reason for Non-payment	49	F (8)
Unpaid, time of return	49	F (8)
Commodity Rates, remove the application of Classification	48	A (3)
Coupons	50	H
Cancelled	50	H
Character of contents must be marked on package	48	E (1)
Detached, Uncancelled	49	E (1)
For Collection	50	F (12)
Currency, defined	48	A (9)
Currency, Mexican	48	A (9)
Currency Scale	48	A (9)
Currency Rate, defined	48	A (6)
Dolls	48	E (1)
Character of contents must be marked on package	48	E (1)
For Collection	49	F (12)
Recorded	49	E (5)
Unrecorded	49	E (5)
Deposit Books	49	F (7)
Dore Bullion	48	D (1)
Drafts	50	H
Cancelled	50	H
Endorsed, requiring protest	49	F (14)
For Collection	50	F (14)
In payment of Collection	49	F (5)
Paid	49	F (14)
Payable to Order or Bearer	49	F (14)
Sent for Acceptance	50	F (14)
First-Class Rate, defined	48	A (6)
Gold	48	D (1)
Bullion	48	D (1)
Coin	48	D (1)
Cyanides	48	D (1)
Dental	48	D (1)
Dust	48	D (1)
Old	48	D (1)
Sulphides	48	D (1)
Unrecorded	48	D (1)
Goods to be secured at another office, orders for	50	J
Graduated Charges on Currency and Gold Coin	51	B
Graduated Charges on Silver Coin	52	T
Insurance Policies	50	II
Legal Papers	50	F (12)
For Collection	50	F (12)
Transportation Charge	50	H

FIG. 16

F.—(12) Bonds, Coupons or Other Securities, Mortgages or Deeds, Legal or Other Valuable Papers for Collection, must be enclosed in sealed envelopes and endorsed with description and value of contents, and marked C. O. D. \$..... (the amount to be collected). If consignee is to be permitted to examine the papers before payment, instructions to that effect must be marked on package by the shippers, who must release the Express Company, on the Company's form provided for that purpose, from all loss resulting from such examination.

The outward charge must be as required by the Classification on similar paper not sent for collection. The charge on the amount collected and transmitted must be the charge on a Paid C. O. D. of like amount. If returned unpaid the same charge must be made for the returned shipment as applied when originally forwarded, the outward charge being shown as expense on the waybill and package. If any service is to be performed by the Express Company in exchanging promissory notes or other obligations, in examination of titles, or any other service beyond the usual C. O. D. service, the business must not be accepted, except under special contract authorized by the proper officer.

(13.) Notes, Checks, Drafts, Bills and Accounts for Collection, when forwarded must be waybilled P. O. R. (Pay on Return).

+If the whole or any part of such collection is not collected, a charge of 35 cents will be made for the return of the uncollected portion, and the collected portion will be charged for as provided in Rule F (2), but the total charge so made must not exceed what the charge would have been under Rule F (2) had the whole amount been collected.

+If the uncollected portion is turned over to a notary and the receipt of the notary returned with the collected portion, the charge will be 50 cents in addition to the charges on the collected portion.

+If the entire collection is presented, payment declined, and then turned over to a notary and the receipt of the notary returned to consignee, the charge for such service will be 70 cents.

When senders of notes, checks, drafts, bills or accounts make specific request by endorsement on collection envelope to have cash returned instead of remittance by money order, or check, Agents will remit cash in the collection envelope as requested, waybiling same at the charge provided in Rule F (2). This permission for the remittance of cash will not be applicable to C. O. D. shipments except as provided for in Rule F (5). Paid C. O. D.'s may be remitted in cash only when an Agent has no money orders or checks on hand.

(14) +Drafts sent for acceptance, or Notes in blank, sent for Signature: Waybill P. O. R. (Pay on Return), and charge Currency rate on the face value of the paper when returned. If returned without acceptance, or signature, charge 35 cents.

(15) +For Obtaining from Consignee Receipts for Delivery of Packages and returning such receipts to the shipper, a charge of 15 cents for each receipt must be made.

(16.) +When the proceeds of a Collection are, by order of the shipper, deposited in a bank by the Express Company at the place where collection is made, evidence of such deposit must be returned to shipper in the Collection Envelope and charges assessed at 55 cents per \$1,000.00 on the proceeds of the collection, minimum charge 55 cents.

G.—(1) Bills of Lading, for matter shipped by freight lines, when enclosed in sealed envelopes and forwarded as C. O. D., with privilege of examination, must be charged the same as for a package of First-class matter, and in addition, the valuation charge under Rule 13, page 16.

The charge for returning the money will be the same as for a paid C. O. D. of like amount. If the amount is not collected, the Bill of Lading must be returned without additional charge.

Bills of Lading covering shipments of Liquor will not be accepted.

(2) When a Bill of Lading sent by express is by shipper's orders exchanged for a new Bill of Lading, the additional charge for securing the latter and returning it to shipper must be the same amount as was charged for the original B. of Lading.

(3) +Bills of Lading for matter shipped by freight lines when not sealed, and when accompanied by instructions requiring agents, before delivering the Bill of Lading, to obtain signatures to notes, or to place mortgages for record, secure insurance or to render

other service than simply collecting the amount of the C. O. D. and returning the papers to the consignee, the outward charge must be \$1.40 prepaid; the return charge to be as provided in Paragraph F (5).

(4.) Where goods have been shipped by freight and a Bill of Lading for same sent by express C. O. D., the notice of non-payment shall not be given before the arrival of the goods, at destination.

H.—+Legal and other papers in manuscript, including Checks Payable to Order, Cancelled Vouchers, Cancelled Checks, Cancelled Drafts, Cancelled Certificates of Stock, and Insurance Policies (not blank) must be charged the same as for a shipment of first class of the same weight and value. The charge on Checks Payable to Order, under this item, must not in any case be more than the charge at one-third of the Currency rate on the face value of the Checks, minimum charge 35 cents. Cancelled Coupons must be charged Currency rate on the declared value and if the weight exceeds 1 pound, assess additionally the charge for a package of First-class matter of the same weight.

I.—(1) Pawn Tickets.—Parties presenting pawn tickets for redemption of goods or renewal, must be required to state the value of the goods for which the ticket was issued, the amount of which must be entered in the receipt and a memorandum of such value must be attached to the ticket.

(2) The amount necessary for the redemption of the goods or renewal of the ticket, together with the pawn tickets and memorandum of value, must be enclosed in a sealed envelope, with total value of money and goods for which the ticket was issued marked thereon, addressed to the agent of the Company at the point where goods were pledged and charged for at Currency rates prepaid; tickets from one shipper to be presented to different pawnbrokers in the same city may be enclosed in the same envelope.

(3) +The goods, when redeemed and returned, must be charged for at regular rates according to Classification and, in addition, a charge of 35 cents for each lot redeemed, to cover expense of packing or handling.

(4) For the return of a renewed ticket, Currency rates must be charged upon the value of the goods for which the ticket was issued.

J.—(1) Orders to secure goods at another office with or without instructions to accept money in lieu of the goods, must be waybilled P. O. R. (Pay on Return). If the goods are obtained, Classification rates must be charged; if the money is collected, the same charge must be made as for a Paid Collection of like amount.

(2) +If neither goods nor money are obtained, the order must be returned within 10 days, with charges of 35 cents.

(3) The above rule does not apply to orders for the purchase of goods.

K.—When taxes have been remitted by express and paid by the Express Company to the official authorized to receive them, the tax receipt upon its return must be charged for at Currency rate upon its face value.

When a tax receipt accompanies currency or coin remitted by express to pay taxes, the outward charge must be made only upon the amount of currency or coin enclosed. The new tax receipt obtained for return to shipper must be charged for at Currency rate upon the amount stated in the receipt.

L.—+Bank Books accompanying remittances for banks will not be subject to a charge and will be returned for 20 cents.

M.—+For transmitting and delivering papers to be filed or recorded by Federal, State, County or Town Officials, and returning same after record, charge the same as for a package of merchandise of same weight and value, when forwarded, and also when returned, and when any additional service is performed, such as examination of records, charge in addition to the above 75 cents per hour for actual time required, with a minimum charge of 75 cents for such additional service.

+Denotes increase.

FIG. 17



### + Scale Q—Gold Coin.

The following Scale gives the rate per \$1,000.00, which must be charged on shipments of Gold Coin. Amounts of less than \$1,000.00 must be assessed the graduated charge under Scale S.

When the First-Class Rate for 100 lbs. is	The Rate per \$1,000 on Gold must be
\$1.03 and under	\$0.69
Over 1.03 and not over \$2.08	.89
2.08 " " " 2.77	1.03
2.77 " " " 4.16	1.17
4.16 " " " 6.24	1.39
6.24 " " " 8.21	1.73
8.21 " " " 10.40	2.08
10.40 " " " 15.25	2.42

### + Scale R—Currency.

The following Scale gives the rate per \$1,000.00 which must be charged on shipments of Currency. Amounts of less than \$1,000.00 must be assessed the graduated charge under Scale S.

When the First-Class Rate for 100 lbs. is	The Rate per \$1,000 on Cur- rency must be
\$2.08 and under	\$0.55
Over 2.08 and not over \$2.77	.69
2.77 " " " 4.16	.83
4.16 " " " 6.24	1.03
6.24 " " " 8.21	1.25
8.21 " " " 10.40	1.39
10.40 " " " 15.25	1.73
15.25 " " " "	2.08
	2.42

### + Scale S.

**Table of Graduated Charges in Cents for Shipments of Currency and Gold Coin in Amounts of Less than \$1,000.**

Governed by Item B, page 48.

When Rate per \$1,000 is	\$0.69	\$1.03	\$1.39	\$1.73	\$2.08	\$2.42	\$2.77	\$3.11	\$3.47	\$3.81	\$4.16	\$4.55	\$5.54	\$6.24	\$6.93	\$7.62	\$8.32	\$9.01
Amounts \$15 and under	34	34	34	34	34	34	34	34	34	34	34	34	34	42	42	42	48	48
Over \$15 to \$25	34	24	34	34	34	34	34	34	34	34	42	42	42	42	48	48	55	55
" \$25 to \$50	34	34	34	34	34	34	42	42	48	48	55	55	69	83	83	89	89	89
" \$50 to \$75	34	34	34	42	42	48	55	62	69	69	83	83	103	103	103	117	117	117
" \$75 to \$100	34	34	34	48	55	62	69	69	83	83	83	83	103	103	117	117	117	117
" \$100 to \$150	34	42	48	55	69	83	89	103	117	117	125	139	152	159	173	186	194	194
" \$150 to \$200	42	48	55	69	83	103	117	125	139	152	159	173	208	208	225	242	256	263
" \$200 to \$300	48	55	69	83	103	125	139	152	173	173	208	208	242	242	277	291	291	291
" \$300 to \$350	48	55	69	89	117	139	152	159	180	184	222	222	277	277	307	311	325	333
" \$350 to \$400	48	69	83	103	125	152	166	173	191	208	212	242	297	325	333	347	360	367
" \$400 to \$450	55	69	89	111	131	159	186	208	222	242	263	291	311	347	361	402	416	430
" \$450 to \$500	55	69	89	117	139	166	186	194	222	236	250	277	311	347	361	402	416	430
" \$500 to \$550	62	83	103	125	152	180	208	214	236	249	277	291	311	347	361	402	416	430
" \$550 to \$600	69	89	111	131	159	186	208	222	242	263	291	311	347	361	402	416	430	430
" \$600 to \$650	69	89	111	139	166	194	222	236	249	277	291	311	347	361	402	416	430	430
" \$650 to \$700	69	97	125	152	180	208	236	249	277	291	311	347	361	402	416	430	430	430
" \$700 to \$750	69	103	131	159	186	214	242	263	277	291	311	347	361	402	416	430	430	430
" \$750 to \$800	69	103	139	173	208	236	263	291	311	347	361	402	416	430	430	430	430	430
" \$800 to \$850	69	103	139	173	208	236	263	291	311	347	361	402	416	430	430	430	430	430
" \$850 to \$900	69	103	139	173	208	242	277	297	311	347	381	416	430	430	430	430	430	430
" \$900 to \$1000	69	103	139	173	208	242	277	311	347	381	416	430	430	430	430	430	430	430

When Rate per \$1,000 is	\$0.70	\$1.00	\$1.10	\$1.20
Amounts \$15 and under	48	48	55	55
Over \$15 to \$25	55	55	69	69
" \$25 to \$50	55	55	89	103
" \$50 to \$75	125	125	139	139
" \$75 to \$100	159	173	186	186
" \$100 to \$150	194	208	222	222
" \$150 to \$200	228	242	263	263
" \$200 to \$250	263	277	297	297
" \$250 to \$300	297	311	347	347
" \$300 to \$350	347	347	381	381

† Denotes increase.

FIG. 18



cation. It will be noted in Fig. 18 that charges are based on value and not on weight, and it will also be noted that in some cases, as in Scale Q, for gold coin, the rates are made with relation to rates on ordinary merchandise.

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### MISCELLANEOUS SERVICES

**21.** The express companies render other services even more remotely connected with traffic work than those just discussed, and they will merely be mentioned here, although they are of material value in their respective fields. The departments that perform these special services are: (1) The Financial Department. The special function of this department is to provide for the transfer of money without transporting the money itself; this is done by means of money orders. (2) The Order and Commission Department. This department works along the lines suggested by its name, one of its functions being to bring buyers and sellers together where such a service will result in an increased use of the express service. (3) The Foreign Department. This department takes care of matters arising in connection with the transaction of business with foreign countries, such as acting as forwarding agent for overseas shipments.

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### EXPRESS CLAIMS

**22.** Express claims are in some ways similar to freight claims, but they have their own peculiarities, that require a distinct treatment. It is important to know that the American Railway Express Company has made systematic and very successful efforts not only to get claims adjusted promptly and fairly, but to find the removable causes for claims, and to provide the necessary remedies. One of the common causes of claims has been improper marking. For example, many claims are the result of conditions like those illustrated in Fig. 19, where the address was placed on the overlapping edge of the paper and part of it was torn away. More stringent regulations relative to the marking of shipments, and the carry-

ing on of educational campaigns among all concerned, have resulted in a reduction in the number of shipments failing to reach their destinations safely, and a corresponding decrease in the number of claims.

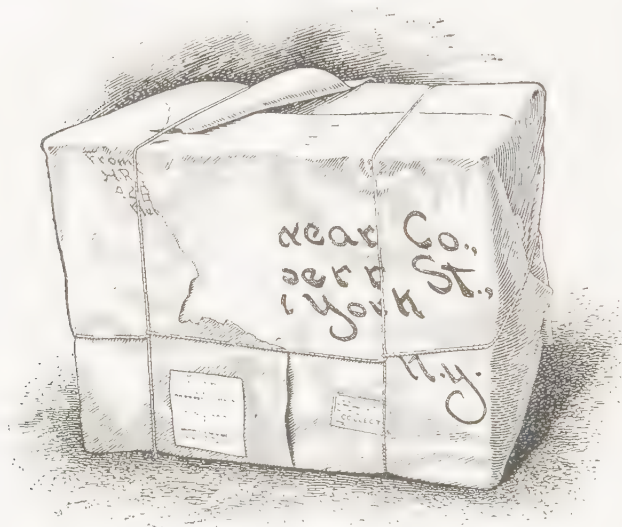


FIG. 19

**23.** The American Railway Express Company has issued very plain instructions as to the manner of filing claims for loss or damage, and also for tracing express shipments. These instructions are as follows:

**PRESENTATION OF LOSS AND DAMAGE CLAIMS**

- (a) The Company provides a "Blank for Presentation of Loss and Damage Claims" which when properly prepared by claimants, gives the information necessary for proper investigation of claims. This form should be used or followed when presenting claims.
- (b) Claims may be presented to the local express agent or direct to the claim agent—but in all cases claims must be entered at the place at which the claimant desires payment made.
- (c) On receipt of a claim at the claim bureau, a number will be assigned and prompt acknowledgment sent the claimant, showing express company number assigned—also claimant's number, if any.

## TIME LIMIT IN WHICH LOSS AND DAMAGE CLAIMS MAY BE FILED

- (a) *Claims must be filed with the express company within four months of date of delivery of shipment, or if not delivered, then within four months and fifteen days from date shipment was forwarded.*

EXCEPTION—Claims for Apparent Damage or Delay.

- (b) *Prior to January 10th, 1921, The Uniform Express Receipt stated that in case of non-delivery, the claim should be entered within four months after a reasonable time for delivery. The new receipt fixes this "reasonable time" as fifteen days.*
- (c) *Suits against the express company for loss or damage may be instituted at any time within two years from the date when the claim is declined in writing by the express company.*

## SUPPORTING PAPERS REQUIRED

*When you file a claim, enclose the following:*

- (a) In your letter show how the amount of claim is determined, that is:
1. Nature and extent of loss or damage.
  2. Invoice price of articles.
  3. Amount of claim.
- (b) Exact copy of express receipt to establish:
1. Forwarding office.
  2. Date of receipt.
  3. Shipper's name and address.
  4. Article (number of pieces).
  5. Weight.
  6. Value or amount of C. O. D.
  7. Consignee and destination.
  8. Charges (prepaid or collect):
  9. Name of express employe signing receipt.
- (c) *Itemized descriptive invoice.* This is needed in order to identify the shipment in the event it has lost its mark. Many trade invoices submitted are of no value whatsoever for searching purposes, as they do not describe the missing article or contents. When castings or machinery parts are lost, always show the weight, dimensions and marks or numbers appearing on the castings or parts.
- (d) Consignee's original complaint or a copy of it. (This will expedite the adjustment.)
- (e) Any additional information in your possession. There may be facts or circumstances known to you, which you consider non-essential, but which might aid very materially in the investigation. Give all of the facts or circumstances in your first letter and save time for all concerned.

## WHEN SHIPMENTS ARE 'DELIVERED IN BAD ORDER

- (a) The attention of the company's representative should be called to shipments delivered in bad order, that an opportunity be given to verify the extent of damage.

- (b) Any loss or damage found to exist after delivery should be reported to the company's agent immediately upon discovery by the consignee. When such loss or damage is not discovered until after the shipment has been opened, the package should be kept intact, particular care being taken to preserve all portions of the wrapping bearing names, addresses, marks, numbers, labels, etc., until the express company's representative can make an inspection. In case of shortage in contents, weigh the shipment.
- (c) Pending the settlement of any dispute or disagreement between the consignee and a deliveryman or other representative of the express company, as to questions of loss or damage in connection with property transported, the consignee should avoid further loss or damage *by promptly accepting the property* from the express company. Such action on his part in no way affects any valid claim which may exist against the company.

#### CORRESPONDENCE REGARDING CLAIMS

When occasion arises to correspond with the express company regarding claims pending, the claim agent or other official handling the claim should be addressed and his file reference quoted, otherwise there may be delay in matching up the correspondence.

#### NECESSARY REQUIREMENTS FOR THE HANDLING OF TRACERS

- (a) *Tracing express shipments* does not ordinarily expedite delivery, and tracers should not be instituted unless and until notice has been received from consignee that the goods have not arrived, such notice being of a date long enough after the date of shipment to allow ample time for the shipment to be transported and delivered.
- (b) Tracing should be done through local express offices.
- (c) *Requests to show delivery of shipments* (except C. O. D's., and money or valuable shipments) should be accompanied by written statement from the consignee, or copy thereof, that a part of or all of shipment has not been received.
- (d) *Requests to trace for returns on C. O. D. shipments* should not be made until forty (40) or seventy (70) days have elapsed since the date the shipment was forwarded (except in the case of perishable shipments), this length of time depending on whether the agent at destination was instructed to hold the shipment thirty (30) days or sixty (60) days before returning it to the shipper in case the consignee refuses it. If, however, the shipper has received information that C. O. D. shipment has been delivered and returns have not been received, the express company should be notified immediately.

**24. Publications Useful for Shippers.**—The principal publications needed in connection with the handling of express shipments have been already described, but for convenience

of traffic men or others wishing to obtain them they are listed as follows:

Official Express Classification.

Described in connection with Fig. 2.

Joint Directory of Express Stations.

Shows block numbers and subblock letters. Described in connection with Figs. 5 and 6.

Joint Directory of Collection and Delivery Limits at Express Stations.

Described in connection with Fig. 7.

Local and Joint Block Tariff.

Shows tables of blocks and rates. Described in connection with Figs. 8 and 9.

Local and Joint Schedule of First- and Second-Class Express Rates.

Shows rates. Described in connection with Figs. 10, 11, and 12.

Local and Joint Tariff of Terminal and Switching Charges.

Described in connection with Art. 19.

International Block Tariffs.

This applies to shipment to adjacent foreign countries.

If the publications mentioned cannot be obtained through the local office of the express company, application should be made to the Traffic Manager, American Railway Express Company, 51 Broadway, New York City.

## THE PARCEL POST

**25. System of Rates.**—The parcel-post system of rates is based on zones, but the zones are established on an entirely different basis than are the zones used in the adjustment of express rates. Parcel-post zones, of which there are eight, are established by drawing around any point of origin a series of circles with radii having lengths as indicated in Fig. 20 under the head of Zone Distances.

For making parcel-post rates, the United States is divided into units approximately 35 miles square, and these units are designated by numbers that can be ascertained by reference to the Official Postal Guide.

In view of the method by which the parcel-post zones are determined, it will be plain that the number of the zone in which any delivery point is located will depend on the point of origin of the shipment. This necessitates the providing of a Zone Key for each unit. Fig. 21 is a zone key for Unit 916. Similar keys for other units can be obtained from the Post Office Department.

**26.** The method of finding in what zone a given post office is located is as follows:

Suppose, for example, that it is desired to make a shipment from Scranton, Pa., to St. Louis, Mo. The Official Postal Guide shows that Scranton is in Unit 916 and St. Louis in Unit 2371. The unit numbers of the points of origin and of destination having been found, this information is applied in Fig. 21 to find the zone in which St. Louis is located. It will be noted that the heading of Fig. 21 shows that this Key is applicable from Unit 916, and that in this case the units numbered 2352 to 2384, inclusive (and therefore Unit 2371), are in zone 5. The rate can then be found by referring to Fig. 20 where rates for all weights up to and including 70 pounds are shown. It will be noted that the word Local appears over the

# DOMESTIC PARCEL POST

Weight in Pounds	Zones								
	Local	1st	2d	3d	4th	5th	6th	7th	8th
1	\$0.05	\$0.05	\$0.05	\$0.06	\$0.07	\$0.08	\$0.09	\$0.11	\$0.12
2	.06	.06	.06	.08	.11	.14	.17	.21	.24
3	.06	.07	.07	.10	.15	.20	.25	.31	.36
4	.07	.08	.08	.12	.19	.26	.33	.41	.48
5	.07	.09	.09	.14	.23	.32	.41	.51	.60
6	.08	.10	.10	.16	.27	.38	.49	.61	.72
7	.08	.11	.11	.18	.31	.44	.57	.71	.84
8	.09	.12	.12	.20	.35	.50	.65	.81	.96
9	.09	.13	.13	.22	.39	.56	.73	.91	1.08
10	.10	.14	.14	.24	.43	.62	.81	1.01	1.20
11	.10	.15	.15	.26	.47	.68	.89	1.11	1.32
12	.11	.16	.16	.28	.51	.74	.97	1.21	1.44
13	.11	.17	.17	.30	.55	.80	1.05	1.31	1.56
14	.12	.18	.18	.32	.59	.86	1.13	1.41	1.68
15	.12	.19	.19	.34	.63	.92	1.21	1.51	1.80
16	.13	.20	.20	.36	.67	.98	1.29	1.61	1.92
17	.13	.21	.21	.38	.71	1.04	1.37	1.71	2.04
18	.14	.22	.22	.40	.75	1.10	1.45	1.81	2.16
19	.14	.23	.23	.42	.79	1.16	1.53	1.91	2.28
20	.15	.24	.24	.44	.83	1.22	1.61	2.01	2.40
21	.15	.25	.25	.46	.87	1.28	1.69	2.11	2.52
22	.16	.26	.26	.48	.91	1.34	1.77	2.21	2.64
23	.16	.27	.27	.50	.95	1.40	1.85	2.31	2.76
24	.17	.28	.28	.52	.99	1.46	1.93	2.41	2.88
25	.17	.29	.29	.54	1.03	1.52	2.01	2.51	3.00
26	.18	.30	.30	.56	1.07	1.58	2.09	2.61	3.12
27	.18	.31	.31	.58	1.11	1.64	2.17	2.71	3.24
28	.19	.32	.32	.60	1.15	1.70	2.25	2.81	3.36
29	.19	.33	.33	.62	1.19	1.76	2.33	2.91	3.48
30	.20	.34	.34	.64	1.23	1.82	2.41	3.01	3.60
31	.20	.35	.35	.66	1.27	1.88	2.49	3.11	3.72
32	.21	.36	.36	.68	1.31	1.94	2.57	3.21	3.84
33	.21	.37	.37	.70	1.35	2.00	2.65	3.31	3.96
34	.22	.38	.38	.72	1.39	2.06	2.73	3.41	4.08
35	.22	.39	.39	.74	1.43	2.12	2.81	3.51	4.20
36	.23	.40	.40	.76	1.47	2.18	2.89	3.61	4.32
37	.23	.41	.41	.78	1.51	2.24	2.97	3.71	4.44
38	.24	.42	.42	.80	1.55	2.30	3.05	3.81	4.56
39	.24	.43	.43	.82	1.59	2.36	3.13	3.91	4.68
40	.25	.44	.44	.84	1.63	2.42	3.21	4.01	4.80
41	.25	.45	.45	.86	1.67	2.48	3.29	4.11	4.92
42	.26	.46	.46	.88	1.71	2.54	3.37	4.21	5.04
43	.26	.47	.47	.90	1.75	2.60	3.45	4.31	5.16
44	.27	.48	.48	.92	1.79	2.66	3.53	4.41	5.28
45	.27	.49	.49	.94	1.83	2.72	3.61	4.51	5.40
46	.28	.50	.50	.96	1.87	2.78	3.69	4.61	5.52
47	.28	.51	.51	.98	1.91	2.84	3.77	4.71	5.64
48	.29	.52	.52	1.00	1.95	2.90	3.85	4.81	5.76
49	.29	.53	.53	1.02	1.99	2.96	3.93	4.91	5.88
50	.30	.54	.54	1.04	2.03	3.02	4.01	5.01	6.00
51	.30	.55	.55	1.06					
52	.31	.56	.56	1.08					
53	.31	.57	.57	1.10					
54	.32	.58	.58	1.12					
55	.32	.59	.59	1.14					
56	.33	.60	.60	1.16					
57	.33	.61	.61	1.18					
58	.34	.62	.62	1.20					
59	.34	.63	.63	1.22					
60	.35	.64	.64	1.24					
61	.35	.65	.65	1.26					
62	.36	.66	.66	1.28					
63	.36	.67	.67	1.30					
64	.37	.68	.68	1.32					
65	.37	.69	.69	1.34					
66	.38	.70	.70	1.36					
67	.38	.71	.71	1.38					
68	.39	.72	.72	1.40					
69	.39	.73	.73	1.42					
70	.40	.74	.74	1.44					

**ZONE DISTANCES**

First zone, approximate radial distance, 50 miles; 2d zone, 150 miles; 3d zone, 300 miles; 4th zone, 600 miles; 5th zone, 1,000 miles; 6th zone, 1,400 miles; 7th zone, 1,800 miles; 8th zone, all over 1,800 miles

**INSURANCE**

Up to \$ 5.00..... 3 cents  
Up to 25.00..... 5 cents  
Up to 50.00..... 10 cents  
Up to 100.00..... 25 cents



# OFFICIAL ZONE KEY TO PARCEL POST GUIDE FOR UNIT NUMBER 916

## POST OFFICE DEPARTMENT

Series I

By order of the Postmaster General

Unit Nos.	Zone	Unit Nos.	Zone	Unit Nos.	Zone	Unit Nos.	Zone	Unit Nos.	Zone	Unit Nos.	Zone
01- 012	7	915- 917	1	1314-1323	3	1779-1789	5	2601-2628	5	3429-3441	7
9- 311	4	918- 920	2	1324-1332	4	1805-1827	4	2629-2639	6	3451-3476	6
315- 316	3	921- 925	3	1333-	5	1828-1839	5	2651-2677	5	3477-3490	7
355- 361	4	926- 928	4	1364-1372	3	1855-1876	4	2678-2701	6	3501-3524	6
362- 366	3	960- 961	3	1373-1382	4	1877-1905	5	2702-2725	5	3525-3539	7
407- 410	4	962- 964	2	1383-1394	5	1906-1925	4	2726-2753	6	3551-3572	6
411- 416	3	965- 967	1	1395-1398	6	1926-1956	5	2754-2773	5	3573-3601	7
458- 459	4	968- 970	2	1415-1421	3	1957-1973	4	2774-2805	6	3602-3618	6
460- 466	3	971- 975	3	1422-1432	4	1974-2008	5	2806-2821	5	3619-3655	7
508-	4	976- 979	4	1433-1444	5	2010-2022	4	2822-2858	6	3656-3664	6
509- 516	3	1012-1020	2	1445-1449	6	2023-2060	5	2859-2866	5	3665-4034	7
558-	1	1021-1025	3	1465-1469	3	2065-2069	4	2867-2990	6	4035-	8
559- 614	3	1026-1029	4	1470-1481	4	2070-2187	5	2991-2992	7	4051-4082	7
615- 617	2	1062-1070	2	1482-1494	5	2188-	6	3001-3039	6	4083-4085	8
658- 662	3	1071-1075	3	1495-1499	6	2202-2236	5	3040-3043	7	4101-4131	7
663- 667	2	1076-1080	4	1515-1517	3	2237-2249	6	3051-3088	6	4132-4135	8
708- 712	3	1112-	3	1518-1531	4	2252-2286	5	3089-3097	7	4151-4179	7
713- 718	2	1113-1119	2	1532-1544	5	2287-2291	6	3101-3137	6	4180-4186	8
759- 761	3	1120-1124	3	1545-1549	6	2302-2335	5	3138-3147	7	4201-4227	7
762- 770	2	1125-1131	4	1562-1580	4	2336-2340	6	3151-3185	6	4228-4236	8
808- 811	3	1162-	3	1581-1593	5	2352-2384	5	3186-3196	7	4251-4275	7
812- 820	2	1163-1169	2	1594-1599	6	2385-2390	6	3201-3234	6	4276-4286	8
821- 861	3	1170-1174	3	1610-1630	4	2402-2433	5	3235-3246	7	4301-4323	7
862- 864	2	1175-1181	4	1631-1643	5	2434-2440	6	3251-3283	6	4324-4336	8
865- 867	1	1212-1214	3	1644-1649	6	2452-2482	5	3284-3296	7	4351-4370	7
868- 870	2	1215-1217	2	1657-1679	4	2483-2490	6	3301-3331	6	4371-4386	8
871- 873	3	1218-1224	3	1680-1690	5	2502-2531	5	3332-3344	7	4401-4416	7
877- 878	1	1225-1231	4	1706-1729	4	2532-2540	6	3351-3380	6	4417-4436	8
909- 911	3	1262-1273	3	1730-1739	5	2552-2580	5	3381-3392	7	4451-4463	7
912- 914	2	1274-1283	4	1755-1778	4	2581-2589	6	3401-3428	6	4464-5813	8

The following States are wholly within the indicated zone:

CALIFORNIA, 8; DISTRICT OF COLUMBIA, 3; ILLINOIS, 5; NEVADA, 8; OREGON, 8; PORTO RICO, 7; RHODE ISLAND, 3; WASHINGTON, 8; WISCONSIN, 5.

The following shall be considered as of the 8th zone:

ALASKA  
CANADA  
CANAL ZONE

CUBA  
GUAM  
HAWAIIAN IS.

MEXICO  
PHILIPPINE IS.  
REPUBLIC OF PANAMA

SAMOA N. IS.  
U. S. POSTAL AGENCY, SHANGHAI, CHINA

FIG. 21

first column of rates, which indicates that, at the rate listed, delivery will be made from the office of mailing or on any rural routes that operate from that office. It will be further noted that the weight limit for the first three zones is 70 pounds and for the remaining zones 50 pounds.

In connection with parcel post, some very definite regulations are provided relative to packing requirements, and to matter that cannot be sent by parcel post. It is very essential that these requirements be complied with, as the Post Office Department is not so lenient as transportation companies in overlooking minor violations of regulations.

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### CHOOSING BETWEEN EXPRESS, PARCEL POST, AND FREIGHT

**27.** The express service is in competition with the parcel-post service for packages of the weights that can be moved by parcel post, and with the freight service on heavier shipments. It is for the traffic man to determine which agency will provide the best service, *all things considered*. In coming to a determination on such matters, cost will naturally be a factor to be considered, and it must be remembered that the amount paid the transportation agency does not always constitute the entire cost; for in the case of freight transportation, there is often a trucking charge at one or both ends of the journey.

Other things to be considered are the time consumed on the road, special services that may be offered by one agency but not by another, security of the goods shipped, responsibility of the carrier, and ease or difficulty of obtaining satisfactory adjustment of any loss or damage that may occur.

Protection against loss or damage of parcel-post shipments can be obtained only by insurance, and the amount of insurance is limited to \$100 per package. The rates are shown in the lower part of Fig. 20. The Post Office Department rules regarding adjustment of insurance claims are very strictly construed.

**28. Publications.**—While full information in regard to any shipment by parcel post may always be obtained at the

post office where the shipment is to be made, those making extensive use of the parcel post will find it convenient to possess, for reference, the Official Postal Guide, which can be bought of the Superintendent of Documents, Government Printing Office, Washington, D. C. This Guide contains postal rules and regulations, lists of post offices, and much other postal information. The list of post offices by states shows the unit numbers to be used in ascertaining zone locations in the parcel post service, and a Zone Key is furnished to each purchaser of the Guide. For a slight additional payment, monthly supplements showing changes that take place in post offices, rules, etc., will be furnished.

Postal Laws and Regulations is the name of another book of reference that will sometimes be useful to the shipper, though if he does not care to purchase it, it can be consulted at any post office. This book contains the laws and regulations governing the postal service and employees. It is sold, with amendments issued periodically, by the Superintendent of Documents, Government Printing Office, Washington, D. C.

## INDEX

NOTE.—In this volume, each Section is complete in itself and has a number. This number is printed at the top of every page of the Section in the headline opposite the page number, and to distinguish the Section number from the page number, the Section number is preceded by a section mark (§). In order to find a reference, glance along the inside edges of the headlines until the desired Section number is found, then along the page numbers of that Section until the desired page is found. Thus, to find the reference "Academic work, §6, p47," turn to the Section marked §6, then to page 47 of that Section.

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